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AIR FORCE JOURNAL of LOGISTICS

EDUCATING THE LOGISTICIAN

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ARTICLES

DEPARTMENTS

Purpose The *Air Force Journal of Logistics* provides an open forum for the presentation of issues, ideas, research, and information of concern to logisticians who plan, acquire, maintain, supply, transport, and provide supporting engineering and services for military aerospace forces. It is a non-directive, quarterly periodical published under AFI 37-160V4. Views expressed in the articles are those of the author and do not necessarily represent the established policy of the Department of Defense, the Department of the Air Force, the Air Force Logistics Management Agency, or the organization where the author works.

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Graduate Logistics Education

Major Terrance L. Pohlen, USAF, PhD
M. Theodore Farris II, PhD

Introduction

The rapid and widespread changes underway within logistics require a broad-based and better educated logistician. The expanded use of information technology, sophisticated models and simulation, and inter-functional integration require individuals with the capability to understand the new technologies as well as the ability to manage change within their organizations. Many logisticians rely on a masters degree as the means to obtain the broadening and the education needed to comprehend and manage the numerous changes occuring within logistics. Graduate logistics programs have responded to this requirement by emphasizing problem solving tools, incorporating the management philosophies adopted by leading firms, and focusing on the application of quantitative techniques to logistics problems. A wide variety of graduate logistics programs exists to provide a masters degree in logistics or a related field. The type of program and specialization depends largely on the individual's background and needs.

Many universities and the military graduate schools offer masters degrees to help meet logisticians' educational requirements. The wide range of programs, curricula, and areas of emphasis make it difficult for the average logistician to determine the most appropriate program for one's particular interest. This article begins by discussing why military and business logisticians should consider a masters-level education in logistics and identifies the leading programs available to them. The key differences between these programs, their areas of emphasis, and admissions contacts are also provided. The article concludes with a discussion of how graduate logistics programs are evolving in response to the changing needs of the military and business logistician.

Need for a Graduate Education

A graduate education in logistics management can assist logisticians by broadening their perspective, developing problem solving skills, and expanding their knowledge of logistics and related disciplines.

Masters programs in logistics management can broaden students' perspective by providing exposure to all of the major logistics functions such as materials management, inventory, materials handling, warehousing, transportation, maintenance and repair, and logistics planning. The concepts within each course demonstrate the trade-offs between the different logistics functions and how they interrelate to affect system performance. Students are required to examine logistics as a total system and not from the perspective of a specialized logistics function. Masters courses also incorporate many of the nontraditional functions of logistics such as order processing, purchasing, and production scheduling.

The cornerstone of most masters programs includes courses targeted at improving problem solving skills. Case studies, specialized studies, and consulting projects allow students to apply the classroom principles and quantitative tools to real-world problems. The courses illustrate the types of problems confronting leading logistics organizations and identify different techniques for potentially resolving the problems. Lessons learned from how leading organizations have solved their problems enable students to better understand the decision-making process and the factors considered in most decisions. The students also learn how and where to apply skills learned in coursework as well as how to effectively present their recommendations to senior management.

Graduate studies primarily serve students by expanding their knowledge of logistics management and its underlying principles. Coursework and readings describe how logistics has developed, the principles that guide logistics operations, and theory underpinning these concepts. Related courses in finance, accounting, statistics, marketing, and mathematics provide the foundation for many logistics principles and facilitate an understanding of how logistics interacts with other business and military functions. These courses also enable logisticians to communicate logistics requirements, limitations, and capabilities to their nonlogistics counterparts.

Curriculum

Logistics programs at the masters level generally fall within a masters of business administration (MBA) or specialized masters of science (MS) degree program. The two differ primarily in their degree of specialization in logistics. An MBA program provides a more generalized business degree with a wider range of required courses in related fields such as finance, marketing, accounting, management, and economics. The MBA curriculum may include three to four courses specializing in logistics management. Examples would include courses such as logistics, transportation, purchasing, or logistics decision making. An MS degree offers a much more specialized logistics program and would draw on nonlogistics courses only to achieve specific objectives. Core courses would include courses in areas such as logistics management, transportation, inventory management, and purchasing. Noncore or tools courses would encompass the subjects needed to understand or implement the concepts contained in the logistics core courses. Subjects in noncore courses would include quantitative decision making, statistics, calculus, modeling, and simulation.

Graduate Logistics Programs

The increased emphasis on logistics and the emergence of logistics and transportation as major business disciplines during the past three decades has resulted in numerous schools offering continued education in logistics and transportation management. (1) The logistics programs at these schools differ primarily in area of emphasis, degree of specialization, research focus, and military or business environment.

Military Programs

The Air Force Institute of Technology (AFIT) Graduate School of Logistics and Acquisition Management and the Naval Postgraduate School (NPS) offer specialized masters of science degrees in logistics management, management, and related subspecialties. Both schools provide an opportunity for officers and defense civilians from the United States and other nations to examine the application of logistics management tailored specifically to a military environment. These unique, defense-oriented programs differ significantly from business logistics programs due to the specialized nature of the course offerings, a larger number and wider range of logistics courses, a high concentration of logistics faculty, and a focus on military applications and related thesis research. In many instances, the programs, courses, and research offered by AFIT and NPS have no civilian equivalent.

AFIT, the graduate school of the United States Air Force, has granted graduate degrees in logistics management since 1963; however, the Graduate School of Logistics and Acquisition Management was not established as a separate school for graduate logistics education until 1992. The school is accredited by the Commission on Institutions of Higher Education of the North Central Association of Colleges and Schools and is currently seeking candidacy for accreditation by the American Assembly of Collegiate Schools of Business. AFIT is part of Air University and its parent major command, Air Education and Training Command. The Graduate School of Logistics and Acquisition Management has the unique distinction of being one of only a very limited number of schools to possess a department of logistics management. The school offers a Masters of Science in Logistics Management with several specialized programs or majors including logistics management, acquisition logistics management, supply management, and transportation management. A Masters of Air Mobility is also offered to Air Mobility Command officers specializing in the planning and executing of large-scale air mobility operations. The program is taught by distance education and by visiting AFIT faculty at the Air Mobility Warfare Center, Fort Dix, New Jersey. (2)

The Naval Postgraduate School provides advanced professional studies at the graduate level for military officers and defense officials from all services and other nations. It exists for the sole purpose of increasing the combat effectiveness of the Navy and Marine Corps, and accomplishes this by providing post-baccalaureate degree and nondegree programs in a variety of subspecialty areas not available through other educational institutions. NPS supports the Department of the Navy through the continuing programs of naval and maritime research. The Department of Systems Management offers specialized curricula in transportation logistics management, transportation management, acquisition and contract management, systems acquisition management, administrative sciences, systems inventory management, resource planning and management for international defense, materials logistics support, financial management, and manpower, personnel, and training analysis. The systems management curricula leads to a masters degree in management which is accredited by the National Association of Schools of Public Affairs and Administration. (3)

Civilian Programs

Many civilian programs offer either an MBA with a major in logistics or transportation or an MS in a logistics discipline. A recent survey of logistics and transportation educators rated these programs based on faculty visibility and participation, research contributions, reputation of the logistics program, graduate and undergraduate curriculum, alumni influence in industry, and college or university reputation. (1:304-308) Based on these criteria, five major logistics programs were identified (in order of ranking): Pennsylvania State University, University of Tennessee, Michigan State University, The Ohio State University, and Arizona State University. Each of these programs is discussed based on their research focus and emphasis.

Pennsylvania State University-State College (Penn State) bases its logistics program in the Business Logistics Department and is one of the largest graduate programs in the field. The faculty includes editors of two of the most widely read and recognized professional research journals; *Transportation Journal* and the *Journal of Business Logistics*. Penn State has joined forces with the University of Tennessee and Michigan State University to complete the research study "Creating Logistics Value."

The University of Tennessee (UT) continues its long-standing tradition of excellence in the field of transportation. It has been a leader innovating the incorporation of quality throughout all aspects of the MBA graduate program. In a similar fashion, UT has promoted an integrated systems approach to their logistics program.

Michigan State University (MSU) was one of the first schools to champion the "Total Cost Concept," addressing the impact of logistical change on the overall cost incurred across all functional areas. The program is a hybrid between the Management Department and the Marketing Department which furthers the cross-functional importance of logistics. MSU has traditionally had a strong purchasing program as well as embarking into the global logistics arena through their "World Class Logistics Practices Research." This research represents the evolution of 14 years of related studies in logistics strategy.

The Ohio State University (OSU) developed its logistics program through a focus on physical distribution management and customer service. It is housed in the Marketing Department and has recently opened a Supply Chain Management Center. OSU continues to host the Council of Logistics Management's Educator's Conference providing an arena to exchange and stimulate future logistics research and thought. It is also known for conducting the annual Survey of Career Patterns in Logistics to further understand trends in the field. Recent research efforts from students in the program include activity based costing, environmental logistics, and efficient consumer response.

Arizona State University's (ASU) strengths have traditionally been in the areas of transportation and purchasing. The programs are part of the Business Administration Department. The program has strong ties with the National Association of Purchasing Management (NAPM) which is located in the ASU Business Park. Many faculty and graduate students work closely with NAPM's Center for Advanced Purchasing Studies (CAPS).

Other schools included in the study's rankings (in order) were: Northwestern University; University of Maryland; Massachusetts Institute of Technology; Iowa State University; University of British Columbia; Harvard University; University of Minnesota; Indiana University; University of Pennsylvania; Syracuse University; Stanford University; Northeastern University; University of Arkansas; University of South Florida; Auburn University; University of California, Los Angeles; University of Illinois at Urbana; University of Georgia; University of Texas-Austin; University of Colorado-Boulder; Kent State University; University of Alabama; Texas A&M University; University of Illinois-Chicago; and Washington State University.

Admissions Points of Contact

Admissions requirements and information regarding the degree programs discussed earlier may be obtained from the following points of contact:

Institution	Location	Internet Address	Phone
Air Force Institute of Technology	Wright-Patterson AFB, OH	counselors@afit.af.mil	(513) 255-7293
Arizona State University	Tempe, AZ	asumba@asuvm.inre.asu.edu	(602) 965-3332
Michigan State University	East Lansing, MI	mba@pilot.msu.edu	(800) 467-8622
Pennsylvania State University	State College, PA	jhh2@psuvm.psu.edu	(814) 863-0474
The Ohio State University	Columbus, OH	cobgrad@cob.ohio-state.edu	(614) 292-8511
University of Tennessee	Knoxville, TN	Not available	(615) 974-5033
Naval Postgraduate School	Monterey, CA	Not available	(408) 656-3093

Future Directions for Logistics Education

Graduate logistics education appears headed in the direction of becoming more applications oriented and expanding the use of technology within the classroom. A panel of graduate logistics educators at the annual Society of Logistics Engineers (SOLE) symposium held on 22 August 1995 in San Antonio, Texas, identified these trends as possible future directions for graduate logistics education.

Overall, logistics programs have become more applications oriented with a focus on the integration of business functions. New information is being included in the coursework to broaden the knowledge the logistician can bring to bear on management problems. Subjects such as the management of technology, management philosophies (total quality management, just in time (JIT) inventories, etc.), behavioral issues, and human resource development are receiving greater attention. Logistics programs are also attempting to increase their interface with business practictioners to bring more experience and real-world problems into the classroom.

New technology will play a major role in the education process as well as in course offerings. Courses or lectures on management information systems in logistics programs frequently address the expanded use of information technology in logistics. Innovations such as electronic data interchange (EDI), automatic data collection, and artificial intelligence have acted as logistics multipliers by increasing inventory velocity, decreasing order cycle times, and providing the information necessary for integrating the supply chain between vendors, wholesalers, and retailers. New logistics management philosophies have resulted from these innovations and given rise to concepts such as JIT, quick response (QR), activity based costing (ABC), and efficient consumer response (ECR) systems. (4) Technology is also changing the graduate logistics education process.

Schools such as AFIT and Virginia Polytechnic Institute (VPI) have incorporated distance education to provide graduate courses to students at remote locations and permit greater access to their logistics programs. VPI uses distance education to offer logistics engineering courses to students at multiple sites within Virginia. The program provides greater student access to a limited number of logistics professors within the state. AFIT has adopted a combination of distance education and on-site classes to offer a new graduate degree program in air mobility. The program enables AFIT to serve a larger number of Air Force students while offering a wider range of programs.

Summary

Graduate logistics education provides a unique opportunity for an in-depth examination of the many issues and changes confronting the business and logistics communities. Logisticians can study the management philosophies, decision-making processes, and techniques used by leading-edge organizations to gain a competitive advantage while simultaneously reducing logistics costs. Masters programs in logistics management further serve the logistics community by broadening students' perspective beyond their technical specialty, providing key problem-solving skills, and expanding their overall knowledge of logistics as well as related management functions. Many civilian and military educational institutions offer a graduate education in logistics management; however, the schools differ significantly in degree of specialization and area of emphasis within the logistics process. Graduate logistics education is also continually adapting and responding to the changing needs of the logistics practitioner. More specialized courses with increasing technology applications are becoming prevalent, and graduate institutions are changing their educational processes to incorporate greater flexibility in course format, content, location, and relevance.

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What Does the Future Hold for Young Logisticians?

David Streett

The logistics profession is at a crossroad. There is a great need to educate and train young people in current logistics technology and skills. Most logisticians working in the defense industry today did not come to their current profession through formal logistics education and training. They grew into their job with experience and developed the skills required to accomplish their objectives. Without a strong push for an increased awareness of the logistics profession and an increase in formal logistics educational programs, our increasingly complex profession, as we know it, will become stagnate in the not-so-distant future. Because a logistics company is only as good as its personnel, industry, working with colleges, universities, and professional societies like the Society of Logistics Engineers (SOLE), must provide the necessary incentives to their young logisticians to generate interest in professional logistics training and education. The demand for well-trained, multidisciplined logisticians is growing. Therefore, who better to meet the logistics challenges of tomorrow than the hard-charging, young logisticians of today? This paper will focus on the current environment for logisticians, what the future job outlook for young logisticians may hold, and conclude with what must be done to ensure young logisticians are around to become "old logisticians."

Introduction

Occupations that once offered solid careers are now in decline. Changing technology and business practices, coupled with increased foreign competition are reshaping America's work force. Some job markets are on the rise, while others are displacing hundreds, even thousands of workers. This year's 1.1 million new graduates will flow into a market already crowded with victims of corporate downsizing. Logistics graduates or young people trying to get into the field of logistics face many challenges in today's ever-changing job market. In today's rapidly changing, international marketplace, it is increasingly important for young people who are planning their careers to be aware of what occupations will be in demand in the future. While they cannot stop the tide, the best they can do is to know which way it is running.

Current Environment for Young Logisticians

The college graduating class of 1995 can look forward to a job market in which hiring will increase 6% from 1994. Starting pay for new graduates will be up 3%. (1:110) Table 1 provides regional salary information for logistics positions. Employment is expected to increase 22% between 1992 and 2005, and the number of employed people will increase from 121.1 million to 147.5 million. (2:46)

LEVEL	NORTH EAST	SOUTH EAST	NORTH CENTRAL	SOUTH CENTRAL	WEST COAST
ENTRY	$23,000	$24,800	$23,900	$28,600	N/A
SENIOR	$38,000	$35,200	$37,700	$39,500	$35,700
MANAGER	$47,000	$47,900	$44,500	$53,500	$53,800

Table 1. Regional Salary Survey (3:88-94)

But what do these statistics mean for those entering into logistics professions? Overall, employment in engineering-related fields, such as logistics, is expected to grow faster than others. However, the outlook for young people coming out of the military or new college graduates wanting to get related DOD logistics positions does not appear as bright. Due to the number of individuals seeking logistics positions and the increasingly technical skills required, job seekers with previous experience or specialized training have an advantage when competing for jobs.

In addition, as the defense budget continues to decrease and defense contractors continue to "right size," a large number of young logisticians are being forced out of jobs. Because of reengineering or restructuring, these young people are usually caught by not having enough seniority or by not being diverse enough so their employer can shift them around to different projects. In the past when money was abundant, companies could afford to shift personnel and then pay for them to come up the learning curve. Companies today do not have this luxury.

However, is this lack of diversification really the fault of the young logisticians? With many companies counting pennies, the first budget usually to be cut is the training budget. Due to tight budgets, companies are not able to send their young logisticians to formal training classes and seminars. Therefore, it is often left up to the young individuals to educate themselves on current or even new technologies. As the job structure of the US economy continues to change, education and training costs will shift from companies to employees. Both the employed and job seekers will be required to bring more skills to the workplace.

The other issue that plagues young logisticians is that in today's current work environment, all too often, senior logisticians are not willing to take new, young, hard-charging logisticians "under their wing" for the fear of those young persons learning their jobs and making their positions obsolete.

Even in cases where young logisticians are lucky enough to "hang on" during downsizing, the chances for advancement are sometimes nonexistent. The scenario that young people are facing is that middle management positions are being held by individuals not old enough to retire, or if a position opens up, it is not being filled due to corporate restructuring. So what is the future job outlook for young logisticians?

What Does the Future Hold?

With reduced or nonexistent training budgets and the common fear that assisting in training new people increases competition, young logisticians are being left to fend for themselves. For young people coming out of college or the military, employment in defense logistics is clouded by uncertainty. With the reduction in DOD spending, many defense logistic companies are trying to shift to a greater commercial customer base. Some of the hurdles they face is that there are already a large number of companies in the commercial logistics arena that are well known and established. In addition, many large manufacturing companies, which one would think have a large need for logistics services, already have an in-house logistics department. While there will continue to be a need for "young blood" in defense logistics, the job outlook for the future appears to be greatly swinging to the commercial sector.

So where do young logisticians, who have been entrenched in defense logistics or recently out of college, look for future employment? Research provides overwhelming evidence that a small number of leading-edge, commercial, North American-based firms deploy a superior level of logistical competency and use logistics as a competitive weapon. One hundred or so commercial US companies stand apart from their peers when it comes to their logistics operations. Two examples of such companies, considered by experts to be world-class organizations, are Black & Decker Corporation of Towson, Maryland, and Hershey Foods of Hershey, Pennsylvania. What makes these two companies stand out above the others is they tend to manage their logistics operations as value-added processes and not the corporate stepchild.

In 1989, Hershey Foods integrated their manufacturing and logistics operations into its business lines. They soon after regained the number one position in the confectionery market. Number one does not happen unless the customer is served well, and the customer cannot be served well without support logistics. (4:14-20)

Black & Decker has integrated their logistics department into a functional team consisting of sales, marketing, manufacturing, distribution, and transportation. Black & Decker looks at the logistics process as a total supply chain and feels customer service cannot be attained if any element in the supply chain is substandard. (4:14-20)

Commercial companies are taking logistics seriously, even if it is not a sexy topic. (4:14-20) Logistics has become a key component of corporate strategy as companies realize its importance in improving their competitiveness. Whereas logistics used to be a position one was moved into when a person couldn't handle anything else, companies are now demanding formal education and training in logistics. The commercial sector is rapidly learning that logistics absolutely adds value. Commercial companies are learning that logistics has the potential to become a governing element of strategy as a way of creating value for customers, as well as an immediate source of savings. (5:87)

What Must Be Done

If companies, in both the DOD and commercial sector, expect the next generation to carry on the growth and development of their organization, should they not assist them or prepare to do so? Whether one is a young logistician that is lucky to "stick it out" in defense logistics or someone who is starting in or shifting to the commercial sector, there are three essential tools one must use to ensure one is around to become the old logistician. Those three tools are education, training, and membership in professional logistics societies.

Education

The need for formal education in logistics is a problem that has been recognized for some time. Most logisticians start their careers in the military, either as technicians, instructors, supply personnel, or logistics managers. The military training that is received is excellent and former military personnel are accepted by the defense industry and are considered trained to meet defense industry's requirements with a good deal of success.

However, the demand for diversified and flexible logisticians is growing. Today's all volunteer Services are not teaching all the essential logistics disciplines required to meet the commercial industry's needs. It is not the function of the military Services to train people for commercial industry, and they should not be expected to do so.

While colleges like Colorado Technical University, the Air Force Institute of Technology (AFIT), and Virginia Polytechnical Institute and State University provide undergraduate and graduate-level curriculums in Logistics Systems Management, not everyone has the luxury of being located close enough to these fine institutions to take advantage of the curriculum. There is a need to establish more formal logistics programs at local colleges and universities. Local industry must work with the colleges and universities in their areas to establish logistics programs so young logisticians can become educated in the total logistics spectrum and not just one specific area.

Training

Changes in productivity are often attributed to investment in education and training. (6:27-33) Improvements in the quality of the logistics work force through formal training are necessary for companies to compete in the global market. Even in tough economic times, companies must put forth an additional effort to ensure their young logisticians are trained and armed with the right tools to get the job done. Because changes and technological advances in the logistics industry appear to have increased the demand for highly skilled workers, training will play an important role in enhancing the skills and productivity of young logisticians.

Professional Societies

Membership in professional logistics societies like SOLE, help expose young logisticians to many different logistics elements with which they would not normally be familiar. The contacts and knowledge gained from going to the monthly meetings and workshops will put young logisticians head and shoulders above the non-SOLE members. SOLE members are kept aware of current logistics trends and advancements through monthly publications and workshops sponsored by SOLE. This, just like formal education and training, will help keep young logisticians up-to-date on what is going on in their field.

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CAREER AND PERSONNEL INFORMATION

Logistics Professional Development

Logistics Support Officer Assignments Personnel Update

The consolidation of the Logistics Officer Assignment team is now complete. This consolidation is not to be confused with the "Palace Log" of old, although history does repeat itself. We still provide the same great quality service to our individual specialties while, at the same time, providing a broad perspective on logistics.

Team Composition:

Major Ed Hayman - Branch Chief
Major Toby Seiberlich - Transportation
Captain Tom Jet - Transportation
Major Steve Shinkle - Aircraft/Missile Maintenance
Captain Roger Rostvold - Aircraft Maintenance
Captain Rick Cornelio - Logistics Plans
Captain Keith Quinton - Logistics Plans
Captain Craig Bond - Supply
Captain Debbie Elliot - Supply

The Logistics Team address is HQ AFMPC/DPASL, 550 C Street West, Suite 33, Randolph AFB TX, 78150-4735. We can be reached at DSN prefix 487-ext or commercial (210) 652-ext for the following:

Maintenance	3556
Plans	5788
Transportation	4024
Supply	6417

Our FAX number is ext 3408. E-mail address is last name + first initial@hq.mpc.af.mil.

Logistics AFSC Conversion

Effective 31 October 1995, the numeric "21" will identify "Logistics" replacing 22, 23, 24, and 25 and structuring all logistic officer AFSCs into one career field (21XX). All lieutenant colonel and colonel authorizations (except 20C0) in logistics are converting to AFSC 21L "Logistician" to identify our senior leadership positions. The conversion looks like this:

Old Prefix	New Prefix	Specialty Area
21A	no change	Aircraft Maintenance
22S	21M	Space/Missile Maintenance
23S	21S	Supply
24T	21T	Transportation
25L	21G	Logistics Plans

Logistics Cross Flow

There are a lot of rumors on the street concerning the new and improved logistics cross flow program. The official program does not begin until October. A message is forthcoming from the Air Staff that will provide guidance and direction. The program is being implemented to develop well-rounded officers for the challenges and demands of leadership in a complex logistics environment. More to come . . .

(Maj Steve Shinkle, AFMPC/DPASL, DSN 487-3556)

Civilian Career Management

Logistics Civilian Career Enhancement Program (LCCEP) Career Development Training

The Logistics Civilian Career Enhancement Program (LCCEP) is one of nineteen career programs sponsoring centrally managed career development training. The *Air Force Civilian Career Programs Training and Development Guide,* available in your servicing civilian training office, details the training offered. The major thrusts of the LCCEP's centrally managed career development activities are Career Broadening, LCCEP funded Long-Term Full-Time Training, the University of Texas at Tyler program, Tuition Assistance, Long-Term Training, and Short-Term Training.

In 1979, the LCCEP initiated its Career Broadening program. Career broadening provides on-the-job training opportunities at different levels and commands. Selection places the employee on one of 35 worldwide career broadening positions assigned to the LCCEP. Career broadening benefits the Air Force and the individual by strengthening current logistics skills and developing new skills through a variety of work experiences and opportunities. Since 1979, the LCCEP has career broadened more than 300 registrants.

In 1978, the LCCEP began the Long-Term Full-Time Training (LTFT) program. This program selects high potential registrants for full-time attendance at local accredited universities to study management, business, logistics, acquisition, and mission-related courses at the graduate or upper-level undergraduate level. The LCCEP has funded well over 150 LTFT students in the past 17 years.

In 1989, the LCCEP began the University of Texas at Tyler program. The program provides selected registrants with tuition, travel, and per diem to attend courses at the University of Texas at Tyler, Texas. Students earn 24 semester hours by attending in-residence classes for one month each spring and fall semester in two consecutive years. Each student must also transfer 12 additional hours of graduate-level college courses to the

university. Successful completion of the program earns each participant a Master of Science in Technology degree with an emphasis in logistics. The LCCEP has graduated over 30 students since the inception of the program.

In 1991, the LCCEP began its Tuition Assistance program. Qualified registrants receive financial assistance to take mission-related college courses at the graduate and upper-level undergraduate levels on a part-time basis during off-duty hours. The LCCEP has assisted well over 800 registrants achieve their educational goals through Tuition Assistance.

Since its inception, the LCCEP has provided its registrants with Long-Term Training (LTT) and Short-Term Training (STT). Centrally-funded LTT is off-the-job training of more than 120 consecutive duty days. The highest qualified candidates compete for selection consideration at the Air Force level. LTT includes opportunities for both Professional Military Education and Professional Civilian Education. Professional Military Education includes in-residence Air Command and Staff College, Air War College, National War College, and Industrial College of the Armed Forces. Professional Civilian Education includes the Alfred P. Sloan Fellows School of Management at Massachusetts Institute of Technology (MIT), the John F. Kennedy School of Government at Harvard, the Legislative (LEGIS) Fellows Program, the Congressional Fellowship Program, and others. STT courses provide current management skills training to logisticians in grades GS-11 through GS-15 and are generally less than two weeks in length.

In summary, the LCCEP provides centrally managed career development training and experiential opportunities. The competitive programs offered have benefited hundreds of LCCEP career program registrants as well as the Air Force. The LCCEP stands committed to continue facilitating future opportunities for career development training for its registrants.

(Mr John Fernandez, AFCPMC/DPCL, DSN 487-5351)

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Conclusion

If you do not think about the future, you cannot have one. With so many uncertainties in today's job market, young logisticians must ensure they are ready for the challenges that lie ahead. Education, training, and membership in professional logistics societies will give young logisticians an edge that in the not-so-distant future, could decide if they are still employed.

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The Society of Logistics Engineers: An Overview

Compiled from Various Sources

Introduction

The Society of Logistics Engineers (SOLE) is a nonprofit international professional society composed of individuals organized to enhance the art and science of logistics technology, education, and management. The Society is in no way sponsored by any group, company, or other association; rather, it is the outgrowth of ideas, suggestions, and feelings of frustration on the part of thousands of logisticians. SOLE was founded in 1966 to engage in educational, scientific, and literary endeavors to advance the art of logistics technology and management.

SOLE Organization

Board of Directors

The Board of Directors (BOD) establishes the policies for the activities of SOLE, acts on all proposed revisions to the bylaws, and is the final authority of the conduct of SOLE affairs. The board reviews, contributes to, and accepts the long-range plan as prepared by the Long-Range Planning Committee, and may propose recommendations for future objectives, organizations, and operations. The BOD traditionally meets in February, June, and August (at the annual symposium).

Executive Board

The Executive Board (EXB) directs the activities of SOLE and assumes all duties for management of SOLE, as specified by the Board of Directors. The EXB prepares and presents an annual budget to the BOD and specifies those activities to be administered by the Executive Director and SOLE's international headquarters. The EXB traditionally meets four times a year in February, June, August (at the annual symposium), and October.

Chapters and Districts

There are currently over 145 SOLE chapters in 33 countries throughout the world. Districts are formed by the geographical grouping of chapters. Chapter activities include regularly scheduled meetings with guest speakers, open forums or discussions on matters of professional interest, seminars and symposia, the sponsorship of logistics courses and curricula, the publication of instructional material and newsletters, or other activities designed to enhance the logistics profession. Chapters and districts also sponsor regional technical meetings.

Committees

No society can function without an organized, well-coordinated committee structure. SOLE is no exception. To this end, the following standing committees have been formed to take full advantage of the experience and expertise available within the membership of the society.

Committees Operating Under the Auspices of the Board of Directors:

- Nominations/Election Committee
- Awards Committee

Committees Under the Direction of the Executive Board:

- Education Committee
- Finance Committee
- District Affairs Committee
- Membership Committee
- Publications Committee
- Bylaws/History Committee
- Annual Symposium Steering Committee
- Technical Development and Training Committee
- Long-Range Planning Committee
- Public Relations Committee
- International Committee
- CPL Qualifications Review Board
- Ethics Committee

Board of Advisors

The SOLE Board of Advisors provides guidance to the SOLE Board of Directors on policy matters and assists the Board of Directors in charting its long-range course of action to achieve its goals of advancing the profession of logistics. The members of the Board of Advisors have been carefully selected to bring together the often diverse viewpoints of leaders in commerce, industry, the military, and academic fields.

Professional Certification

Logistics is a professional discipline. SOLE's Certified Professional Logistician (CPL) program recognizes the professional stature and ethics of logisticians within commercial, defense, and aerospace related industries; federal and local government agencies; academic; and private institutions. This certification recognizes the functional interrelationships within the responsibilities of logisticians, regardless of their occupational roles.

The certification program is administered by a CPL Qualifications Review Board (CPL-QRB) who is responsible for reviewing the eligibility of applicants, conducting CPL examinations, and notifying candidates of their results. The examinations, prepared by SOLE's Education Committee, are held twice a year at announced times.

Certification is granted to logisticians of proven competence who pass an examination designed to test their broad knowledge of the entire logistics field. The CPL examination is comparable to a master's degree level of difficulty. The four parts of the CPL examination are Systems Management, Systems Design

and Development, Acquisition and Production Support, and Distribution and Customer Support.

Candidates who successfully pass the certification examination and meet all other requirements of the Society are awarded a specially-designed lapel pin, a certificate, and the title "C.P.L." after their name. The professional designation may be used in a dignified manner similar to the recognition accorded the accounting, medical, insurance, and other professions.

Education

SOLE works very closely with educational institutions throughout the world. The Society, through its individual members, local chapters, and its Education Committee, has fostered the development and implementation of logistics oriented courses and graduate and undergraduate curricula.

In recognition of the need to support the academic community, the Society of Logistics Engineers formed the Logistics Education Foundation.

Logistics Education Foundation

The Logistics Education Foundation (LEF), established and chartered in 1974, is an independent corporation formed by the members of SOLE to solicit funds and to encourage, promote, and facilitate the education of logistics engineers, managers, and educators. The LEF is an organization specifically created to foster improved logistics education by furnishing an important means of interdisciplinary and interorganizational communications. This impetus provided by the Foundation is needed to meet future requirements for logistics professionals.

The LEF is comprised of volunteer practitioners and educators from a wide variety of organizations throughout the world. Foundation members have a vital concern in the future of logistics technology and informed faith in the capacity of this technology to help solve many difficult economic and social problems.

Projects designed by both SOLE and LEF and sponsored by the Foundation are directed toward improving the responsiveness and quality of logistics research and teaching, which, in turn, will benefit government, industry, and academia.

As a part of the overall program, LEF has identified education needs of the highest priority and seeks to channel resources to meet those needs. As a result, the Foundation plays a catalytic role in stimulating logistics oriented education programs. One program funded by the LEF, developed under the direction of SOLE, is the CPL Preparatory Course designed to assist SOLE members in preparing for CPL certification.

The LEF also acts as a clearinghouse for requirements and available talent and funds to enhance the relevance of logistics education for both the short- and long-term needs of the Society.

Scholarships

Each year, the LEF makes funds available to the Scholarship Awards Committee of SOLE to award to individuals pursuing education in the field of logistics or other closely-related field. These scholarship awards are given to assist deserving full-time students in junior colleges, four-year universities, and graduate schools. The awards are presented to individuals only.

The scholarships offered in the graduate and undergraduate categories are usually equal in number so that applicants will have the same opportunity for an award at their respective educational level.

Selection is competitive, based on need, scholastic ability, courses taken or planned, future endeavors, and proposed use of the funds. The competition is open to both members and nonmembers of the Society of Logistics Engineers.

Scholarships are presented in the name of the Society of Logistics Engineers, the Logistics Education Foundation, or specific donors if so desired. While most are from a general scholarship fund, some are donor specific, or restricted.

Educational Program Grants

One of SOLE's major objectives is to promote the development and implementation of logistics education programs in universities and colleges. Meeting this objective is important for two reasons:

(1) To ensure the availability of education and training programs to help personal growth and professionalism in the field of logistics.

(2) To highlight logistics so that it is recognized and accepted in the academic community.

To accomplish this objective, SOLE has taken steps to assist universities and colleges in developing degree programs and educating individuals to meet the needs of the marketplace.

One project, initiated and supported by LEF funding, was to define educational criteria for logistics degree-granting programs for universities and colleges. The first step was to determine the tasks and knowledge that would be required of a logistician. The interdisciplinary approach to logistics used by SOLE served as the basis for this determination. To this end, a life-cycle approach was assumed, with logistics functions being accomplished in all phases of a given program. The result was a guide that includes model logistics programs for four different academic tracks in logistics and outlines suggested program requirements and courses.

Another LEF funded project identifies all universities and colleges currently offering logistics programs in their curriculum. The listing is in the form of a database placed on a computer bulletin board and is complemented with a paper copy. This has proven to be a valuable resource for prospective students in logistics.

These guides for logistics education programs are available to SOLE chapters and academic organizations interested in developing a logistics curriculum at the university/college level. Request for copies of these guides and bulletin board access information are available from SOLE Headquarters.

Membership Benefits

Publications

SOLE publishes a quarterly professional journal, *Logistics Spectrum*, which is distributed without charge to all society members. Nonmembers may also subscribe to this publication. In addition, members also receive a monthly *SOLEtter*, the society's administrative news bulletin. Also, SOLE publishes a biannual journal, *The Annals of the Society of Logistics Engineers*. This publication contain papers which present new

findings and significant advancements in the art and science of logistics.

Professional Development Programs

The Society of Logistics Engineers believes that the maximum interchange of knowledge between all elements of the logistics community is vital to the continued development of the logistics profession. For this reason, SOLE works very closely with other professional societies and is cosponsor of important technical symposia. One of these is the Annual Reliability and Maintainability Symposium. Other regional, national, and international symposia are held with several related professional societies and major universities.

The Society sponsors an Annual International Logistics Symposium and Technical Exposition, which brings together several hundred members and nonmembers from all over the world, in a three-day technical meeting in which a large number of technical papers are presented by the leaders in the field of logistics. These papers are available to symposium attendees and to others in a bound volume of Proceedings. The Proceedings have proven to be valuable reference sources.

SOLE also sponsors an Annual International Logistics Congress in a location outside of the US. The program emphasizes the international applications of logistics and promotes better understanding among logisticians working in the US and overseas.

SOLE members receive discounts on registration fees to attend the professional development programs.

Awards Program

The Society of Logistics Engineers, through its bylaws, policy, and precedent, has an awards program designed to recognize individuals or organizations for extraordinary contributions in the field of logistics and related disciplines and/or their support of the Society's objectives (Table 1).

Selections for the awards are made annually, and the recipients honored at the awards banquet held in conjunction with the Society's Annual International Logistics Symposium and Technical Exposition.

Job Referral Service

The Job Referral Service operated by the society is designed to bring potential employers and unemployed members together. It has been a highly successful program since its inception, resulting in the placement of temporarily unemployed skilled logisticians in positions where these talents can be utilized.

Electronic Bulletin Board

SOLE uses advanced technology to communicate important, timely information to its members through a state-of-the-art electronic bulletin board.

SOLE Membership Directory

SOLE members receive a current comprehensive SOLE Membership Directory that contains information needed to network with other members around the globe.

Summary

Innovation, quality, and superior performance is what it takes to be successful in today's global, competitive market. The Society of Logistics Engineers—the world's largest network of logisticians—helps meet these challenges today and in the future.

Additional information may be obtained by contacting the SOLE International Headquarters at:

Society of Logistics Engineers
8100 Professional Place, Suite 211
Hyattsville, MD 20785
USA
(301) 459-8446

References

1. The Society of Logistics Engineers. *1994 Member Handbook and Membership Directory*, April 1994.
2. The Logistics Education Foundation information brochure (Form LEF-2), January 1992.
3. The Society of Logistics Engineers information brochure, undated.
4. The Certified Professional Logistician Program information brochure, undated.

Major Awards	Other Awards
Founders Medal SOLE's highest award—for outstanding leadership in the field of logistics	**Field Awards**
Henry E. Eccles Medal For outstanding leadership in logistics education	**Annual Chapter Awards**
R. J. Armitage Medal For outstanding achievements and contributions in logistics literature	**Annual Leadership Awards**
The Williams Medal For outstanding achievements and contributions in space logistics	**Scholarship Awards**
SOLE Distinguished Service Medal For outstanding contributions to SOLE	**Prize Paper Awards**
President's Award for Merit For outstanding contributions in supporting SOLE's goals and objectives	**Outstanding Logistics Graduate Award**
	Chapter Newsletter Awards
	District Newsletter Award
	International Newsletter Award
	Top Recruiter Award
	Top Growth Chapter Award
	Young Logistician Awards

Table 1. Society of Logistics Engineers (SOLE) Awards

Maintaining a Dinosaur in the Change Age

David E. Davenport
Keith R. Shelton

Introduction

For 65 million years dinosaurs dominated the earth forcing successful competitors to become larger, stronger, and even more fierce. About two million years ago, a change began and an insignificant creature—man—appeared on the scene. Earth evolved and those creatures, unable or unwilling to change, became fossilized memories. Today's dinosaurs are businesses continuing to stand firm in the face of change, stating, "This is the way we've always done business—it made us what we are today." These businesses are resolute in ignoring the need for shorter production cycle time and improved quality manufacturing to six sigma or even higher standards. These businesses face the same fate as the dinosaur.

The Perry memorandum is a striking example of the change to defense business. Military Standards (Mil-Stds) are to be the exception, not the rule. In all cases, a movement to less restrictive commercial standards, when those standards will meet the product requirement, is the order of business. A direct quote from the Perry memorandum states, "Waivers for the use of military specifications and standards must be approved by the Milestone Decision Authority. . . ." (1) Therefore the question to logisticians: "If the only reason to perform logistics support analysis (LSA) is because of the Mil-Std, then is the Mil-Std value added to the product; is it a process the customer is willing to pay for and a process that can change the product?" Just as we step back and reexamine the standard and the need for the standard, we also need to reexamine the place of those technical associations supporting logisticians.

Logisticians have witnessed the development of the defense dinosaur, both in program development and in technical societies. Following World War II, businesses became larger, Government became larger, and integrated logistics support as a subset of that Government business became a reality. Requests for proposals demand integrated logistics support and even reference Mil-Std-1388-1, *Logistics Support Analysis Record*, and Mil-Std-1388-2, *DOD Requirements for Logistics Support Analysis Record*, as the standards for assessing supportability and influencing design. Mil-Std-1388 was revised and renumbered as Mil-Std-1388-1A and Mil-Std-1388-2B. The method for recording the results of the standard has made a massive migration to a central relational database containing all one would ever need to know about supportability of a particular system. It can even be argued that the Mil-Std has become its own dinosaur.

Just as DOD contracts recognized a need for integrated logistics support, logisticians recognized a need to band together sharing common knowledge and promoting logistics. Thanks to this common need and the writings of men like Benjamin Blanchard, Benjamin Ostrofsky, and Donald Bowersox, the Society of Logistics Engineers (SOLE) was formed.

The Change Age

But now, change to the environment is upon us. The dinosaurs of 65 million years ago faced a changing environment where the standard food chain was reduced. Today, DOD expenditures are fewer, the demand for large multiyear purchases requiring huge manufacturing facilities has all but disappeared. Just like the dinosaurs, the mammoth businesses are forced to change and adapt or become memories. However, this change is not painless. For example, some of the mass quantity machines required hours to retool, and the change to agile manufacturing meant new capital expenditures.

The subject of the Society of Logistics Engineers 1993 International Logistics Symposium and Technical Exposition held in Colorado featured keynote speakers telling how their companies are making fundamental changes in the way they conduct business. (2) Bob McLendon of Texas Instruments (TI) explained how the defense sector of his company has fully committed to Total Quality Management (TQM), so much so that monthly cost reviews are now only held semi-annually and the defense sector has instituted quarterly Quality Reviews. The TI monthly focus is now on meeting customer requirements, quality as measured by defects per unit, cycle time reduction, and employee training. Mr McLendon noted that in 1989, Texas Instruments defense systems had 2 billion dollars in sales with 22,000 employees, and in 1992 still had 2 billion dollars in sales, but with only 14,000 employees. The difference is the type of business. It is no longer the long-term contract, but the quick-react contract.

Frank McCabe of Digital Equipment Corporation (DEC) spoke on transforming the value chain where DEC's vision is simply stated as fast, flawless, and simple delivery of value as perceived by their customers. Mr McCabe stated that at DEC, they ask before performing any process if it is something the customer would pay for, and if it is not, then the process is not performed. Mr McCabe said in the 1970s the focus was on cost, in the 1980s on quality and time, and now the focus, while not forgetting cost, quality, and time, is shifting to service. (2)

The consistent, recurring theme delivered at the Symposium was customer focus, total quality management, and designing in and practicing the key concepts of logistics. It is no secret DOD businesses are undergoing a fundamental change in their procurement history. At the 1991 Symposium, it was heard that the US had seven major airframe contractors competing for

defense business, and that in ten years, DOD would only need three airframe contractors. Today, we can see that shift to fewer contractors happening. The effect to defense-related industries, and especially to defense-related organizations such as the Society of Logistics Engineers, is yet to be determined. But, it can be guessed.

The Need for Technical Societies

Defense as an industry, is downsizing. Does that mean the need for technical societies is decreasing? No! In reality, the need for a strong technical society may be greater today than ever before. As the market shrinks and employers look for candidates to eliminate in a reduction in force, there may be very little difference between those who remain and those who stay. Those who stay, those who can profit when all others remain static, will be those with an added advantage that sets them apart from their competition. Technical societies or associations are ideally positioned to provide this advantage. Such organizations can provide a means to advance one's job knowledge, can provide contacts allowing an individual to have expert resources only a phone call away, and can provide for technical training not available from more conventional avenues. The truth, is when a company is downsizing, that is the time when membership in a technical organization is most valuable.

With this established, the concern then is whether or not the technical society can provide value to the member. For the purposes of this paper, the Society of Logistics Engineers will be examined. SOLE is the major voice of logisticians in the defense market. However, it is only reasonable to expect SOLE to change if it wishes to survive as the technical society representing logisticians. Unfortunately, SOLE is experiencing declining membership. During the SOLE Board of Advisors meeting at the 1993 Symposium, it was stated that in 1989 SOLE membership exceeded 10,000; however, in 1993, the membership dwindled to 7,300. (2) Part of this decline may be a result of the shrinking DOD market, but if the principles of SOLE are sound and if those principles do indeed apply to the commercial sector, then it is reasonable to believe SOLE can survive in a declining military market and may be able to be the definitive organization for logisticians in any market. But unfortunately, this survival is not assured.

The environment that fostered the birth of SOLE, as well as other technical organizations, is undergoing massive change; a change where SOLE is competing with other related technical societies. If we believe that downsizing will reduce the number of producers for any given product, then we must also believe that the number of technical societies will be reduced. The same forces that drive companies like Texas Instruments and Digital Equipment Corporation to make fundamental changes in the manner in which they do business are also acting on SOLE. If SOLE is to survive, it must reengineer the organization; take a hard look at its objectives and the objectives of its members; focus on defining member requirements and member needs; and become flexible enough to broaden its base from defense to a total integrated logistics support application in both the commercial and defense sectors.

Objectives of SOLE

As we examine SOLE, we will first analyze its objectives and how it meets those objectives. Based upon this examination, a recommendation of actions that could enhance the society's survival will be offered.

The four objectives published in SOLE's corporate membership information (Table 1) are designed to accomplish the following tasks:

- Advance the Profession.
- Certify Logisticians.
- Develop Educational Programs.
- Provide Training.
- Influence Specification Standards.
- Support Defense Conversions.

Professionalism	Provide improved opportunities for professional growth in the field of logistics by: Assisting in the development of formal logistics programs in schools, colleges, and universities. Conducting logistics seminars, workshops, symposia, classes, and home study courses at the local, national, and international level. Publishing or sponsoring publication of logistics books, studies, monographs, journals, and other publications. Providing a job referral service for students or for retiring or unemployed members.
Technical Development	Define, develop, and communicate analytical engineering and management techniques needed for effective coordination of the various logistics functions. The purpose is to achieve improved support of products while reducing costs.
Interaction	Promote productive professional relationships, joint programs, and the exchange of ideas: Among scientific, engineering, and management disciplines employed in the research, teaching, and practice of logistics. Among logistics practitioners in all types of private enterprise, government, and public service institutions. Between logistics specialists, generalists, and others. With related professional societies, trade associations, and other institutions in the fields of engineering, education, and management.
Recognition of Achievement	Recognize significant achievements in the logistics field by: Conducting a professional certification program. Rewarding outstanding contributions and accomplishments through a continuing program of awards at the international, national, and chapter levels.

Table 1. Objectives of the Society of Logistics Engineers (3)

Professionalism

SOLE's program to accomplish the Professionalism objective consists of publications, a job referral service, workshops and symposiums, and a logistics education arm of the society. The society's two major publications are: the *SOLEtter*, a semi-magazine, semi-newsletter; and *The Spectrum*, a quarterly technical publication. While SOLE does not publish books, it does provide a service to members by contacting publishers and securing books for members on request.

SOLE's national job referral service provides benefit to its membership and each of the local chapters are encouraged to provide, as a minimum, a local point of contact to assist members seeking employment. The success of this activity is somewhat dependent upon the individual, but the service is available and it is working.

Every year SOLE presents a series of workshops and seminars at locations across the nation and the world. The vast majority of these workshops are well received and provide benefits to those in attendance. In addition SOLE's Annual International Logistics Symposium and Technical Exposition is a common ground for logisticians from around the world.

Developing logistics programs in schools is a task that SOLE has tried to implement for many years with varying degrees of success. SOLE even has a separate branch of the organization dedicated to this activity. This branch, Logistics Education Foundation (LEF), has worked for years to gain recognition.

Each of these objective-meeting services provide benefit to the membership and are excellent opportunities for furthering the profession. Unfortunately, the publications, the job referrals, and the workshops are not capable of advancing the profession if the profession is not adequately defined.

Defining Logistics and Logistician

If we examine DOD 5000.2, *DOD Acquisition Management Policies and Procedures*, we find ten elements of logistics as shown in Table 2. (4)

Webster has a more simplistic definition:

> The aspect of military science dealing with the procurement, maintenance, and transportation of military materiel, facilities, and personnel. (5)

The Council of Logistics Management offers:

> Logistics is the process of planning, implementing, and controlling the efficient, cost-effective flow and storage of raw materials, in-process inventory, finished goods, and related information from point of origin to point of consumption for the purpose of conforming to customer requirements. (6:3)

The Society of Logistics Engineers defines logistics as:

> The art and science of management, engineering, and technical activities concerned with requirements, design, and supplying and maintaining resources to support objectives, plans, and operations. (6:4)

Furthermore, if we examine the job responsibilities of logisticians attending the North Texas Society of Logistics Engineers meetings, we will find a variety of responsibilities differing from company to company, leading to the conclusion that logistics is defined differently from company to company and its definition differs in the military and commercial arenas as well.

There exists a question of what exactly is a logistician. In Blanchard's *Logistics Engineering and Management*, he relates logistics to defining a system, and then relates engineering tasks and management tasks to developing the system. Blanchard proposes a systems engineering approach with an emphasis on supportability. (6) The logic follows that logistics may be an offshoot of systems engineering. In reality, only one area of a product development effort ever sees the development of a project from concept to disposal—logistics. In some companies, logistics is titled "product support," or "customer support," or "integrated logistics support." Whatever the title, the task is to build the product to enable cost-effective support, maintenance, disposal, and reclamation.

We are still left with the question. Is the logistician a manager, akin to the systems engineer, but dedicated to support development, or is the logistician an engineer developing reliability and maintainability information? The commercial sector leads us to believe the principle application of logistics is product support, packaging, handling, storage, and transportation. The military defines logistics as partially a front-end analysis and engineering effort as well as product support,

1. Maintenance Planning	Process conducted to evolve and establish maintenance concepts and requirements for life of system
2. Manpower & Personnel	Identification of military and civilian personnel and skills required to operate and maintain the system
3. Supply Support	Management actions, procedures, and techniques to determine requirements to acquire, catalog, receive, store, transfer, issue, and dispose of secondary items
4. Support Equipment	Equipment (mobile and fixed) required to support the operation and maintenance of the system
5. Technical Data	Information recorded in any form or medium (manuals and drawings), but not including computer programs, related software, and financial data related to contract administration
6. Training & Training Support	Processes, procedures, techniques, training devices, and equipment used to train personnel to operate and support the system
7. Computer Resources Support	Facilities, hardware, system software, software development, support tools, documentation, and people needed to operate and support embedded computer systems
8. Facilities	Permanent, semi-permanent, or temporary property assets required to support the system (including studies and analysis to determine assets)
9. Packaging, Handling, Storage , & Transportation	Resources, processes, procedures, design considerations, and methods to ensure all system, equipment, and support items are preserved, packaged, handled, and transported properly, including environmental considerations
10. Design Interface	Relationship of logistics-related design parameters to readiness and support resource requirements

Table 2. Department of Defense (DOD) Elements of Logistics

including training and technical manuals. SOLE takes a middle of the road definition concentrating on design, supply, maintenance, and resources. It is almost as if everyone who has worked in the industry has the right to define logistics as they perceive logistics to be. SOLE, if it is to be the spokesperson for logistics, should make an effort to bring consensus from chaos. There may, in fact, be definable facets to logistics. One split may be the defense versus commercial definition. A second may be front-end engineering versus product support. Clearly, the first goal of SOLE should be to define what the course of study must be before trying to sponsor and implement a course of study.

Technical Development

SOLE's objective of Technical Development is more easily stated than supported. Through analytical engineering and management techniques, one can perform level of repair analyses, life-cycle cost analyses, define procedures and methods for determining environmental impact, and use computer-aided improved tools to meet the intent of Mil-Std-1388-1A. The fact is, the cost to develop these tools is a product of private enterprise. Currently there exists over ten companies with LOGSA (logistics support activity)-approved automated data processing programs that will meet the requirements of Mil-Std-1388-2B. If SOLE were serious about developing processes and procedures for technical development, they would soon lose their nonprofit status.

In 1994, the Environmental Protection Agency held a two-day conference in Dallas to discuss approaches to develop forward-looking cost models to predict the cost of changing the current business processes to a more "green" process. Many of the commercial members were shocked to learn that military logisticians have worked with forward-looking cost models or life-cycle cost models as they are more commonly called, that could easily be modified to identify the cost of pollution prevention.

Just as the attendees at the conference, most of whom only dealt with logistics from the point of view of the commercial sector, were unaware of military life-cycle cost models, there must be many logistics aids in the commercial sector dealing with packaging, transportation, warehousing, storage, material movement and control, or other area of logistics not commonly analyzed in the defense sector. As a rule of thumb, the defense logistician will deal more in the "front-end" areas of logistics, while the commercial sector will concern itself with a more "product support" posture. A more appropriate objective for SOLE might be to review, evaluate, and benchmark those technical development programs that are on the market and develop strategies to bridge the gap between the military and commercial.

Interaction

SOLE's third objective of Interaction to promote productive professional relationships, joint programs, and the exchange of ideas is achievable. As an international society, SOLE is in a position to organize symposia, seminars, and workshops that have the potential to bring these forces together. In the last few years, SOLE has developed some useful workshops and symposia. Since the majority of SOLE membership is defense oriented, the majority of attendees are defense oriented. At the yearly International Symposium, SOLE typically has over 300 members and nonmembers in attendance. The majority are from the defense community thus creating an immediate disconnect in agenda topics. Despite the DOD definition of logistics that includes training; technical publications; computer resources; packaging, handling, storage, & transportation; and support equipment, the vast majority of topics are related to maintenance actions with a sprinkling of environmental concerns thrown in for variety. A review of the Symposium readings for the last four years only confirms that few papers, workshops, and tutorials stray from the steady diet of maintainability, Mil-Std 1388, and environmental protection.

At the 1992 International Symposium in Indianapolis, one of the most fascinating and thought-provoking sessions was the presentation of logistics and the race car. The topic covered maintenance, spares, product reliability, support equipment, mobile facilities, manpower requirements, and packaging, handling, storage, and transportation. This one private enterprise was an outstanding example of logistics operating in the commercial sector. At the Colorado Springs International Symposium (1993), there was an excellent workshop on Cycle Time Reduction, featuring a Cycle Time specialist. There was also a presentation on proposal development. In other words, at the International Symposium there is opportunity for including more logistics areas than the standard fare.

Just as companies are moving away from specialists and towards generalists who have the versatility to perform a multitude of tasks, SOLE needs to move from the specific. There needs to be entire tracts dealing with integration of logistics activities showing how technical manuals, training, customer satisfaction, and product support are accomplished. Warehousing and alternative parts manual approaches are other areas where the logistic generalist could benefit from an increased program scope. SOLE should endeavor to break down its narrow silos of specialists and encourage programs that cut across those silos and encompass all areas of logistics. The topics need to move from Logistics Support Analysis (LSA) and Logistics Support Analysis Records (LSAR) to implementation of logistics analysis into product support activities.

Recognition of Achievement

The fourth objective of SOLE is Recognition of Achievement in the logistics field. SOLE has two primary means of accomplishing this objective. One is the presentation of awards at the annual International Symposium. The other, the Certified Professional Logistician (CPL), is awarded after passing an eight-hour examination. As preparation for passing the examination, applicants are screened based upon their years of service in logistics fields. After successfully passing the screening, the applicants must complete an examination roughly organized into four parts:

Part One	Systems Management
Part Two	Systems Design and Development
Part Three	Acquisition and Production Support
Part Four	Distribution and Customer Support

The examination is based upon a bibliography of source material that is largely unavailable. Based upon a 1994 review of *Books in Print,* some startling statistics are offered and shown in Table 3. Of the 43 books in the reading list, only 13 books are in print. The average age of those books is 15 years. Of the 13 available books, 8 apply solely or in part to Part One; 2 books apply solely or in part to Part Two; 4 books apply solely or in part to Part Three and no books apply to Part Four. It is somewhat odd that one of the objectives of SOLE is publishing or sponsoring logistics books, and yet the CPL list is void of current publications.

	Certified Professional Logistician Examination				
		Part I	Part II	Part III	Part IV
Books in List	43	17	10	10	9
Average Age (years)	21	19	21	18	25
Books in Print	13	8	2	4	0
Avgerage Age (years)	15	17	12	14	N/A

Table 3. Society of Logistics Engineers Recommended Reading List

Unfortunately the CPL exam reflects the age of the reading list. There is a heavy concentration upon memorization of formula instead of understanding of the concepts. Questions in one section are often repeated in other sections. And much of the business theory reflects the way businesses were managed in the 1950's. When studying for the exam, it is often recommended to memorize answers that are no longer considered the best choice because that is the only way to pass the exam.

Even more striking is performing a cross-reference analysis of SOLE's definition of logistics as it is applied to the CPL exam against the DOD ten-point definition. Table 4 shows the areas covered by the CPL. Most striking is that 21% of the exam deals with maintenance planning, 17% concerns packaging, handling, storage, & transportation, 14% dwells on design interface and supply support, 11% with training and training support, and the remainder of the exam has a less than 10% concentration on any element. Most striking of the neglected elements is technical data with only 1% and computer resources support with 0%.

Department of Defense Logistics Elements	Percent of Total Examination Coverage
Maintenance Planning	21%
Packaging, Handling, Storage, & Transportation	17%
Supply Support	14%
Design Interface	14%
Training and Training Support	11%
Manpower & Personnel	9%
Facilities	7%
Support Equipment	6%
Technical Data	1%
Computer Resources Support	0%

Table 4. Department of Defense Elements of Logistics Included on Certified Professional Logistician Examination

Conclusion

Just as the dinosaur faced extinction during the change age 65 million years ago, the technical societies of today face the same fate. For years, SOLE has allied itself to the defense sector and given lip service to the commercial sector. The society could not help but grow as the defense base grew. Now, defense industries are struggling. Those remaining in business are considering mergers and joint venture. The business itself is smaller, leaner, able to react quickly. And the successful defense survivors are those companies who combine total quality with meeting customer requirements. These companies are actively eliminating any part of their business processes that is nonvalue added.

SOLE is positioned to become either a survivor or a fatality of the change age. SOLE has an advantage over other technical societies in that SOLE is witness to the downsizing of defense and also witness to those companies who are able to survive and even increase profitability. These very businesses that are surviving are employing reactions to change that apply to technical societies. In this change-filled environment is the opportunity for great success as well as failure. SOLE may not survive the change age, but there will be a technical organization that will, and that organization will be the one to meet its customer's needs.

Recommendations

The following recommendations may be the guideline for change:

(1) Come to a consensus on the definition of logistics. It may well be that one definition may be applicable to the commercial sector and a second to the defense sector. To accomplish this SOLE and the Council of Logistics Management (CLM) may want to form some sort of partnership, since CLM seems to be more representative of commercial logisticians and SOLE is more representative of the defense sector.

The definition of logistics should be driven by the membership—the ultimate customer. In reaching this consensus SOLE must be prepared to broaden its traditional base. If, in defining logistics, areas such as proposal development, technical writing, warehouse management, transportation, environment/ pollution prevention, etc. are included in the definition, then there should be sections in SOLE publications that deal with those areas. And in the International Symposium, there must be topics aiding those professionals.

(2) Examine how other professional organizations address certification. Here the goal should be to recognize current knowledge of the subject. The American Society of Quality Control (ASQC) recognizes that technological change continually erodes the value of professional certification and has therefore incorporated a plan to continually recertify its members. In their recertification information the ASQC states,

> The primary purpose of this program is to motivate quality professionals to maintain the same level of up-to-date knowledge they demonstrated when they originally became certified. Program requirements are designed to be readily attainable by modest professional activity while preventing casually interested individuals from representing themselves as having current knowledge in their fields when that may not be the case. (7:3)

The American Society of Quality Control requires continual improvement. The Recertification Information brochure lists recertification units (RU) in 13 categories. (7:1) Fifteen recertification units are required every three years to maintain

certification. Table 5 portrays the recognized categories and applicable recertification units.

Category	Recertification Units (RUs)
Educational Activities	1.0 RU per day; no maximum
Section/Chapter Meetings	0.3 RU per meeting; maximum of 5.0 in 3 years
Meeting Workshops	0.3 RU per meeting/workshop
College Courses	3 credit hours x 14 weeks/10 = 4.2 RUs
American Society of Quality Control Courses	1.0 RU per 10 contact hours
Other Noncollege Courses	1.0 Continuing Education Unit = 1.0 RU
Home Study Courses	Evaluated by Certification Committee
Teaching Credit	2.0 RUs per 10 contact hours
Technical Paper Presentation	2.0 RUs per paper
Employment	2.5 RUs per year
Technical Committees	1.0 RU per group; 2.0 RUs per year; 6.0 RUs in 3 years
Other Activities	Evaluated by Certification Committee
Coauthor Credit	2.0 RUs per paper

Table 5. American Society of Quality Control Recertification Categories

The certification program may also include both specialized areas and generalists areas. For the provisioners who have little or no interest in contract management, it would be value added for those individuals to have certification in provisioning. The generalists may wish to have certification in front-end logistics analysis or in product support and customer satisfaction. The commercial sector may only wish to be certified in packaging and handling. The key to survival is providing a service the customer is willing to pay for and a service that is of value to the customer. In many companies there is no value placed on the CPL for many of the reasons already stated.

Summary

SOLE or its successor will be the organization that is able to meet the needs of its membership. Meeting these needs will require acceptance of the change age. The surviving organization will:

(1) Develop an objective that is measurable.
(2) Establish metrics that show progress to meeting that objective.
(3) Provide value to it members and to the companies employing them.

SOLE is well positioned to move into the twenty-first century as the voice of logisticians. It is also well positioned to be overtaken by the change age. It remains to be seen if SOLE will become one of the fossilized dinosaurs or the creature who learned to adapt to its changing environment.

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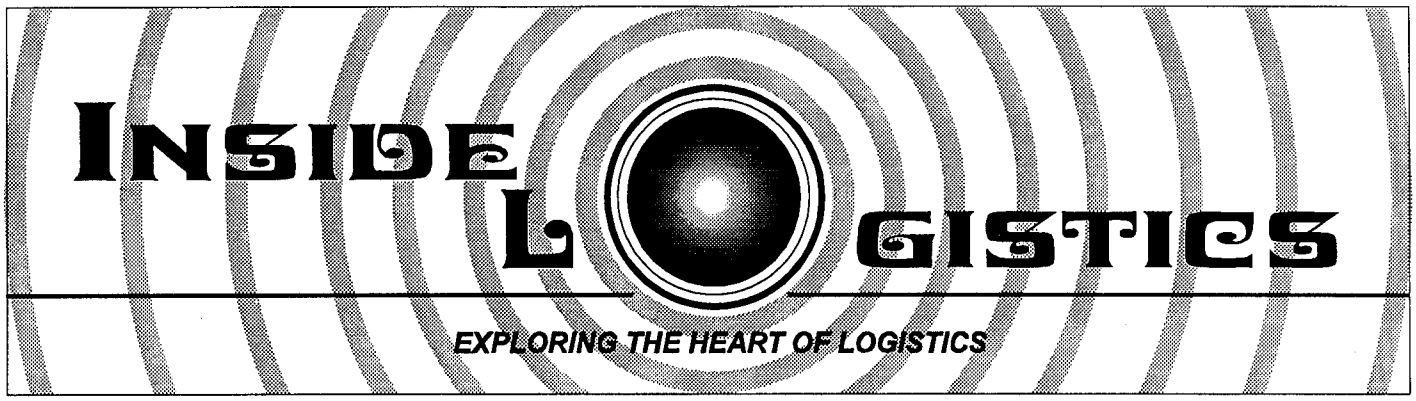
Most Significant Article Award of 1994

The Editorial Advisory Board has selected "A Logistics Life Cycle Cost Guide for the Program Manager" by Colonel Martin D. Carpenter, USAFR, as the most significant article published in the *Air Force Journal of Logistics* during 1994.



Maintaining Air Combat Readiness in the European Theater

Captain Joseph M. Yankovich, USAF

Two years is not a long time. Two years ago the 48th Fighter Wing at RAF Lakenheath was still transitioning from F-111Fs. Pieces and parts of Aardvarks (F-111s) and test equipment were found hidden in empty aircraft shelters—assets that needed to be transferred to Cannon AFB, New Mexico. It was only one year ago that the 494th Fighter Squadron finally received our last F-15E—ten months after the 492nd Fighter Squadron and 494th Fighter Squadron obtained Initial Operational Capability. In those short two years, we have continued to improve and maintain "tip of the sword" air combat readiness in Europe, providing swift, precision air-to-air and air-to-ground combat capability.

We are seeing the results of budget cuts and force reductions, and are told that there is more to follow. We have absorbed personnel and assets from Soesterburg Air Base in The Netherlands, Bitburg Air Base in Germany, and from RAF Alconbury and RAF Upper Heyford in England—bases that have since closed that were once part of a large family of support.

We now have frequent and lengthy contingency and mission deployments, supporting the United Nations, the North Atlantic Treaty Organization (NATO), combined Joint Task Forces, and United States Air Forces in Europe (USAFE). Organizational charts and the chain of command are sometimes unclear to us maintainers. We are told where to go and what time to be there, and it is our job as logisticians to find out how to make it happen. There is rarely time to ask why.

The 48th Fighter Wing has been in and out of Incirlik Air Base, Turkey, for years with the F-111s and supported Operation Provide Comfort (OPC) soon after returning from Operation Desert Storm in April 1991. In August 1993, one month after obtaining Initial Operating Capability and completing our first F-15E Nuclear Surety Inspection, the 492nd Fighter Squadron (FS) deployed six aircraft to help enforce the no-fly zone over Northern Iraq. Ninety days later, in November 1993, a hand off occurred with the 494th swapping aircraft and personnel with the 492nd, leaving the 492nd FS equipment behind. This saved transportation costs and Turkish "red tape."

Another ninety days later in February 1994, minutes after completing a NATO Tactical Evaluation that evaluated fight-in-place and survive-to-operate skills, the 492nd FS was tasked to deploy eight aircraft to Aviano, Italy, for Operation Deny Flight to enforce the no-fly zone over Bosnia. Since most of their equipment was still in Turkey, the 494th FS supplied most of the support equipment.

After 19 months of constant contingency operations, relief was in sight. The 494th redeployed back to RAF Lakenheath from OPC at the beginning of March 1995. For once in almost two years, all of our people, aircraft, and equipment were home, ready to start this process all over.

In summary, after months of experience with the F-15E at two major contingency operations, Provide Comfort and Deny Flight, plus numerous exercises and deployments, we have seen how total readiness is dependent on versatility and flexibility.

Captain Yankovich is presently an aircraft maintenance officer in the 494th Fighter Squadron, RAF Lakenheath, England.

Air Force Armstrong Laboratory Logistics R&D Program

The Logistics Research Division of the Armstrong Laboratory performs research and development (R&D) focused on technology for improving the performance of integrated systems of people, information, and equipment doing essential acquisition and logistics support functions in peacetime and wartime. This includes developing automated job aids and integrated diagnostics for maintenance information trade-off techniques and design tools for integrated product development that allows consideration of weapon system supportability and maintainability from design inception. Applications cover a broad spectrum of field, depot, and space operations with "customers" throughout the Air Force, Department of Defense (DOD), other government agencies, academic institutions, and US industry.

The following are brief descriptions of selected ongoing programs within this Division and is current as of October 1995. Readers interested in obtaining more information about these programs, future plans, or additional details about the Division are encouraged to call the individuals named for each work effort.

AIRCRAFT BATTLE DAMAGE ASSESSMENT AND REPAIR (ABDAR) TECHNOLOGY

OBJECTIVE: Enhance organizational-level ABDAR capability of the USAF by providing battle damage assessors, technicians, and engineers with quick and easy access to assessment and repair information.

APPROACH: A contracted research effort started in August 1995 and will be accomplished in four major phases. In Phase I, a requirements analysis will be performed to ensure user requirements are known prior to system design. Phase II will involve designing the ABDAR demonstration system based on the results of the Phase I study. The design will focus on providing ABDAR information to the user through a portable maintenance aid (PMA). The PMA will contain all of the information required by the user such as assessment and repair logic, technical orders, part information, wiring schematics, and troubleshooting data. A graphical user interface will allow the user to easily access and comprehend ABDAR information. The Phase III effort will involve implementing the software design, authoring technical data, and integrating the system. Data for a specific test-bed aircraft will be electronically created to comply with the DOD Interactive Electronic Technical Manuals (IETM) specifications. Finally, Phase IV will involve final system enhancements and testing for user acceptance.

EXPECTED PAYOFF: Fast and accurate battle damage assessment and repair will lead to improved combat effectiveness by reducing the time to get aircraft back to mission capable status. Less experienced users will have better access to ABDAR information reducing the reliance on highly trained assessors. Deployment capabilities will be enhanced by minimizing the amount of paper technical data and supporting information presently required by the user. (1 Lt J. C. Bradford, AL/HRGO, DSN 785-2606, (513) 255-2606)

ENHANCED CONTINGENCY LOGISTICS PLANNING AND SUPPORT ENVIRONMENT (ECLiPSE)

OBJECTIVE: Demonstrate new technologies and processes to improve the deployment planning process, reduce deployment footprint, reduce deployment response times, and use deployment resources more efficiently and effectively.

APPROACH: The Enhanced Contingency Logistics Planning and Support Environment is a vision for improved wing-level deployment planning and re-planning. Currently, the ECLiPSE Vision is comprised of four integrated initiatives: Deployment Information and Support Environment (DISE); Unit Type Code Development, Tailoring, and Optimization (UTC-DTO); Beddown Capability Assessment Tool (BCAT); and Logistics Analysis to Improve Deployability (LOG-AID). DISE will use advanced integration of computer hardware and software to automate the collection, storage, and retrieval of deployment site survey information. DISE consists of three major subsystems: a suite of computerized/multimedia site survey collection tools, a deployment site knowledge base, and a graphical and collaborative user interface for retrieving information from the deployment knowledge base. UTC-DTO will use advanced software to automatically develop UTCs, automatically tailor UTCs based on individual deployment scenarios, and optimize the packing of UTC equipment onto 463L cargo pallets. BCAT will use advanced database design to compare deployment site force beddown capabilities against deploying forces beddown requirements and produce a list of resource shortfalls. LOG-AID is a requirements analysis that will study the wing-level deployment process firsthand and discover improved processes and technologies to provide order of magnitude improvements to the wing-level deployment machine. The ECLiPSE Vision will culminate in Total ECLiPSE. Total ECLiPSE will use all that we learn from DISE, UTC-DTO, BCAT, and LOG-AID and install these systems and processes at a model base to demonstrate the improvement modern technologies can make in combat forces deployment.

EXPECTED PAYOFF: Improved wing-level deployment planning and execution will increase Air Force combat capability. Reducing mobility footprint will reduce requirements for scarce airlift assets, therefore enabling deployment of additional combat capability. Reducing deployment response time will increase the deterrent effect of our military forces on distant enemies and allow US policy makers to respond more quickly to aggressive actions of distant enemies should deterrence fail. More efficient and effective use of mobility resources will allow the Air Force to maximize its power projection capabilities. (Capt William Z. Zeck, AL/HRGO, DSN 785-2606, (513) 255-2606)

INTEGRATED MAINTENANCE INFORMATION SYSTEM (IMIS)

OBJECTIVES: Improve Air Force maintenance by providing maintenance technicians with an integrated information system capable of providing technicians with all information required to do the job via a portable maintenance aid (PMA). Develop and demonstrate an automated system to integrate and deliver automated maintenance information from various sources to the flight line technician.

APPROACH: This program has three phases. Phase I utilized information modeling techniques (Integration Definition (IDEF)) to identify maintenance information requirements. Phase II was the development of the basic system design. Phase III is the system fabrication and field test. State-of-the-art object oriented software technologies were used for developing the IMIS. The PMA is a special design composed of off-the-shelf modules. This program was worked jointly with the F-16 System Program Office. Field tests were completed at Luke AFB, Arizona, on F-16 aircraft in October 1994. Research and development on this program has been completed. Technology from this program has already been adopted by a number of Air Force weapon systems, including the F-22, JSTARS, F-16, and B-2. IMIS hardware and software has been transitioned to the Electronic Systems Center for the Integrated Maintenance Data System Program.

EXPECTED PAYOFF: Estimated savings are in the hundreds of millions of dollars for both operational and depot organizations. This technology will reduce the number of false removals, reduce the database size, and ultimately reduce the amount of aircraft downtime. (Maj Tom M. Kruzick, AL/HRGO, DSN 785-3871, (513) 255-3871)

INTEGRATED TECHNICAL INFORMATION FOR THE AIR LOGISTICS CENTERS (ITI-ALC)

OBJECTIVE: Improve, standardize, and integrate technical and managerial information, and make it more readily available at the job-site to improve the performance of aircraft programmed depot maintenance (PDM) activities.

APPROACH: This effort has two phases. Phase I, which is currently on contract and scheduled to be completed by April 1996, involves a detailed requirements analysis of current PDM operations at all Air Force Air Logistics Centers (ALCs). The focus of Phase I has been on PDM with a limited evaluation of assemblies, modules, and units. Information modeling has been used to develop "as-is" and "to-be" functional, data, and process models that represent PDM operations and information requirements. Dynamic simulations have been used to investigate process changes and improvements. Products from Phase I of this effort include an architecture report documenting the results of a depot-level requirements analysis, a business case in which depot process improvements have been identified, functional specifications, and a top-level design for an integrated information capability. Phase II will use the results of the requirements analysis phase to design, develop, and test a demonstration-level integrated maintenance information capability for supporting PDM activities. Phase II activities will push the state-of-the-art by evaluating new diagnostic techniques, creating advanced presentation schemes for graphics, employing new database approaches, and testing advanced hardware and software technology. Phase II is anticipated to start in June 1996 and be completed by June 1999.

EXPECTED PAYOFF: Payoff to the Air Force will include specifications for developing a full-scale, depot-integrated maintenance information system for operational use. In addition, the ITI-ALC effort will be providing the ALCs with an independent review of the current PDM process and possible changes or areas for improvement to increase efficiency, lower operating costs, and improve technician performance. (Ms Barbara L. Masquelier, AL/HRGO, DSN 785-2606, (513) 255-2606)

INTEGRATED MODEL DEVELOPMENT ENVIRONMENT (IMDE)

OBJECTIVE: Improve the quantity, quality, and timeliness of information based on logistics simulations.

APPROACH: Using commands have ongoing initiatives which are investigating ways of improving their simulation capabilities; however, these programs have taken an incremental approach. This project has taken a much more aggressive approach. State-of-the-art data management, user interface, and modeling methodologies are being incorporated into the IMDE demonstration system. The goal is to "leap ahead" and demonstrate simulation capabilities far beyond what is currently available. US Army, Navy, and Air Force organizations who utilize simulation in decision support studies, as well as Armstrong Laboratory scientists, will evaluate the utility of the IMDE tool. Work has been ongoing for three years, with results exceeding expectations. Joint work with the Advanced Research Projects Agency (ARPA) will be conducted during FY96 to both extend and refine this modeling tool and to demonstrate its capability.

EXPECTED PAYOFF: Easier to use modeling and simulation software tools will shorten the time necessary to develop analytic models. (Capt Todd Carrico, AL/HRGO, DSN 785-2606, (513) 255-2606)

DESIGN EVALUATION FOR PERSONNEL, TRAINING AND HUMAN FACTORS (DEPTH)

OBJECTIVES: Provide a computer graphics design tool for maintainability analysis and logistics information capture. Using articulated representations of humans, a weapon system developer can see accurate simulations of actual maintenance activity. Provide computer-aided design (CAD)-based tools to allow human performance to be visualized during design evaluation for improved maintainability of new and/or modified systems. Automatically determine certain logistics support requirements and electronic technical manual information.

APPROACH: DEPTH is a program developed by Hughes Missile Systems that integrates off-the-shelf human performance analysis with CAD to provide the designer with a high degree of visualization of human performance capabilities and limitations with respect to the product design. DEPTH currently includes human anthropometry and strength data contained in the Crew Chief Human Model developed by Armstrong Laboratory. Articulation, animation, and behavior of the human figures are implemented through the Jack system developed by the University of Pennsylvania. Linkage of basic human motions into subtasks and analysis of complete maintenance

actions is provided by the networking capability of Parallel Transition Networks (PaT-Nets).

EXPECTED PAYOFF: Cost avoidance in human resources through better job design using DEPTH has been estimated to save about $1.2 million annually for a deployed wing of F-15s and F-16s. (Mr John D. Ianni, AL/HRGA, DSN 785-8340, (513) 255-8340)

INFORMATION INTEGRATION FOR CONCURRENT ENGINEERING (IICE)

OBJECTIVES: Develop technologies to effectively manage information resources and process improvements in support of concurrent engineering. Explore integration issues related to experimental software, basic foundations, and advanced Integration Definition (IDEF) methods. Demonstrate benefits of information integration in an Air Force user environment.

APPROACH: The IICE program is using both experimental and theoretical research to explore issues relating to information-integrated systems and to improve processes in information-intensive environments. The program is divided into eight thrust areas: Experimental Tools, Methods, Technology Transfer, Integrated Systems Theory, Three-schema Architecture, Frameworks, Ontology, and Applications. The wide scope of these thrusts allows research developed under the program to be tested in an application environment. Currently, a demonstration is underway at the Oklahoma City Air Logistics Center (OC-ALC) where IICE technologies are being used to streamline the Airborne Warning and Control System (AWACS) programmed depot maintenance operations, processes, and data flows.

EXPECTED PAYOFF: The IICE program is providing the tools and engineering foundations for creating integrated systems and improving Air Force processes. The resulting products will provide strategic planners with road maps for change and users with ways to improve their systems. The proof-of-concept demonstration at OC-ALC will provide payoff data about improvements brought about with IICE technology. (Capt JoAnn M. Sartor, AL/HRGA, DSN 785-7775, (513) 255-7775)

OPERABILITY ASSESSMENT SYSTEM (OASYS)

OBJECTIVES: Develop and demonstrate a methodology which provides operational users and designers with a common paradigm for identifying, evaluating, and reducing operability issues during system development. Provide tools and techniques for users and engineers to: (1) identify high operator/crew task demands, (2) optimize human/system performance, and (3) conduct man/machine functional allocation trade-offs.

APPROACH: This advanced development program is a toolbox analysts can employ to investigate operability issues. The toolbox contains task analysis, rapid prototyping, human-in-the-loop simulation, and data collection tools. The task analysis tool is designed for use by noncomputer scientists. The tools are integrated through a modular software framework. A unique aspect of OASYS is that when evaluating a multicrew environment, OASYS can provide artificially intelligent human operator models through integration with another AL/HRGA effort, the Operability Model Architecture (OMAR) program. These models are capable of operating the individual crew stations as well as interact with real human-in-the-loop operators. The human operator models would serve as additional crew members during human-in-the-loop analysis of the design.

EXPECTED PAYOFF: OASYS supports designers in determining the right mix of automation and allocation of functions while reducing usability problems. The benefits of such analytic capabilities include more effective and efficient system designs, fewer retrofits to correct design deficiencies, and increased user acceptance of new and/or modified systems. (Capt Kurt Bolin, AL/HRGA, DSN 785-9662, (513) 255-9662)

REQUIREMENTS ANALYSIS PROCESS IN DESIGN FOR WEAPONS SYSTEMS (RAPID)

OBJECTIVE: Enable more efficient and accurate definition, analysis, and management of weapon system requirements as an integral part of the systems engineering model of acquisition.

APPROACH: The RAPID project approach includes 10 months of data gathering and evaluation; 15 months of design, implementation, and initial demonstration; and 13 months of researching extensions, such as expert system technology and internal consistency checking of requirements assertions. Phase I was a period of model building, determining RAPID user needs, and conceptualizing RAPID use. Initial software design efforts included evaluating off-the-shelf software, selecting a basic hardware/software platform and operating system, and arranging field demonstrations. Phase II is oriented to coding, testing, and user validation of both the concept and the software. During Phase III, users will conduct a demonstration and participate in the definition of extensions to the basic requirements management software. Expected extensions include refining the knowledge base foundation and evolving a distributed access design to serve the needs of geographically separated action officers and their acquisition counterparts.

EXPECTED PAYOFF: RAPID offers the potential of reducing manpower through the standardization and rapid review, approval, and reuse of critical acquisition data. This software application offers operational users, designers, and the acquisition corps iterative and effective use of requirements data throughout the system life cycle. (Ms Janet L. Peasant, AL/HRGA, DSN 785-8502, (513) 255-8502)

SUPPORT EQUIPMENT EVALUATION/ IMPROVEMENT TECHNIQUES (SEE/IT)

OBJECTIVE: Analyze problems and determine potential solutions and technology shortfalls pertaining to aircraft support equipment (SE) in general and aerospace ground equipment (AGE) in particular.

APPROACH: This exploratory research and development effort will contain four data gathering and analysis tasks. The first task will include identifying and documenting usability, reliability, maintainability, supportability, and deployability (URMS&D) problems associated with deployable AGE and related SE. These problems should run the gamut from individual end-item type problems to problems affecting AGE processes and systems in general. The second task will include identifying and documenting technologies and processes to provide solutions for the problems. The results of these first two tasks will include documented technology shortfalls. The third

task will require analyzing the solutions to determine the costs and benefits related to each solution. The benefits will be based on comparing "as-is" and "to-be" metrics in the cost and "ility" areas. The results of the third task will feed a combination analysis performed in the fourth task to define the best combination of solutions. The result will be a set of potential AGE modifications and technology insertions to improve the URMS&D of AGE.

EXPECTED PAYOFF: This effort will result in documented AGE problem areas based on user input. In addition, previously undefinable technology shortfalls will be found and documented. Finally, the simulations and analyses will result in one or more recommended Air Force actions including AGE modifications, AGE procurements, and laboratory research programs with documented cost/benefit analyses for each action. (Mr Matthew C. Tracy, AL/HRGA, DSN 785-8360, (513) 255-8360)

MODULAR AIRCRAFT SUPPORT SYSTEM (MASS)

OBJECTIVE: Evaluate and test alternative ways of packaging aircraft ground power functions.

APPROACH: At present, aircraft maintenance and servicing needs are supported by single-function carts such as generators, air conditioners, hydraulic mules, light carts, etc. Among other problems, the current approach to flight line powered support equipment imposes a deployment penalty. A modular approach to support equipment would allow multifunctional carts to be created. Packaging support equipment functions in versatile carts would substantially reduce the logistics footprint for deployment. The research will identify and rank a series of support equipment options. Candidate Modular Aircraft Support System configurations will be defined in league with users and evaluated with respect to engineering feasibility, aircraft applications, affordability, and deployability. We will use current support equipment performance, supportability, and cost profiles to benchmark improvements that might be expected from modular support equipment. One or more MASS technology demonstrators will be fabricated and tested in the field. The design approach will emphasize supportability of the MASS equipment using computer-aided design tools.

EXPECTED PAYOFF: Converting to multifunction from single-function support equipment will directly reduce air mobility footprint. The MASS concept would eliminate up to three C-141 sorties in moving a composite wing. (Mr Edward Boyle, AL/HRGA, DSN 785-5169, (513) 255-5169)

COMPUTER AIDED BUSINESS ENGINEERING (CABE)

OBJECTIVE: Develop and demonstrate technology that allows Air Force acquisition and logistics agencies to more effectively support business process reengineering (BPR), technology readiness evaluations, organizational changes, and the implicit and explicit human issues relevant in implementing these technologies.

APPROACH: This advanced development research program will develop and demonstrate new technology to assist Air Force logistics managers in performing BPR. Research will focus on developing and integrating technology for the front-end phases of BPR such as strategic planning, collaborative "what-if" analysis, cultural/organizational issues, change management, technology assessments, and group-based object oriented modeling and simulation. The Air Force is undergoing tremendous change due to changes in military threat and decreased budget allocations. Air Force managers are unable to make needed process and organizational changes fast enough due to a lack of a BPR technology that is suited to their needs. Most current BPR methodologies and tools are data driven and are focused on achieving radical improvements in the commercial sector. Thus, they often fail when applied to government processes.

EXPECTED PAYOFF: CABE will provide Air Force users with the right technology for reengineering their business processes while addressing their organizations' culture, strategic objectives, and technology. By improving their business processes, Air Force users will achieve dramatic improvements in critical performance measures such as cost, quality, service, and speed. The long-term goal will be an increased war fighting capability with less supporting resources and manpower. (Capt Robert V. Goerke, AL/HRGA, DSN 785-7774, (513) 255-7774)

The Role of the CINCs in the Definition Process

Lieutenant Bart A. Vinskey, SC, USN

Introduction

As an instructor of logistics at the Air Force Institute of Technology, I teach LOG 199, Introduction to Logistics. A very brief part of that course discusses the logistics process of Definition. In LOG 199, we use the Air Force Doctrine Document 40 (AFDD 40), *Logistics,* definition of the Definition process. AFDD 40 states:

> The planning, programming, and budgeting activity defines military requirements for future air and space environments. This process continuously adjusts objectives, programs, and budgets as threats, technologies, and national priorities change. A key aspect in this process is that logistics considerations are addressed in concert with the development of any military capability. (1:4)

Our study of the Definition process concentrates on a study of the Planning, Programming, and Budgeting System (PPBS). Because LOG 199 also discusses Department of Defense organization, especially with respect to the roles of Service chiefs and commanders in chief (CINCs), a question frequently asked by our students is: "What are the input role(s) of the commanders in chief in PPBS?" I thought it might be a good idea for all logisticians to explore this concept. Therefore, this article identifies the input role(s) of the CINCs (the war fighters) in both the Joint Strategic Planning System (JSPS) and the Planning, Programming, and Budgeting System (PPBS). It also provides an explanation as to how these roles influence the results of both planning systems.

PPBS and JSPS Defined

The Armed Forces Staff College Publication 1, *The Joint Staff Officer's Guide,* states:

> The purpose of the Department of Defense (DoD) Planning, Programming, and Budgeting System (PPBS) is to produce a plan, a program, and a two-year budget for the DoD with the **ultimate** [my emphasis] objective of furnishing the combatant commanders [the CINCs] with the best mix of forces, equipment, and support attainable within fiscal constraints. The Joint Strategic Planning System (JSPS) is the formal means by which the Chairman of the Joint Chiefs of Staff (CJCS), in consultation with the other members of the Joint Chiefs of Staff and the combatant commanders, discharges his responsibility to give strategic plans and direction to the Armed Forces of the United States and to interact with the other DoD systems. The JSPS establishes the formal process for review of the national security environment and U.S. national security objectives; threat evaluation; assessment of current strategy and existing or proposed programs and budgets; and proposal of military strategy, programs, and forces necessary to achieve national security objectives. (2:5-4)

Essentially what this says is that the CINCs (combatant commanders) are the customers of the PPBS and that the JSPS is the process which they and others use to express their desires about what should be included in the PPBS. As customers, the CINCs provide inputs to the following: the Joint Strategy Review, the Joint Planning Document, the National Military Strategy, the Defense Planning Guidance, the Program Objective Memorandums, the Chairman's Program Assessment, alternatives to programs included in the POMs, the Program Budget Decisions, the weapons acquisition process, and Congressional hearings. The remainder of this article will concentrate on the input roles the CINCs play in the above mentioned processes. For clarification, I will place the appropriate planning system, PPBS or JSPS, in brackets next to the process as it is discussed.

CINCs' Inputs

Joint Strategy Review (JSR)—[JSPS]

The JSR assesses the strategic environment for issues and factors that affect the national military strategy in the near and long term. It facilitates the integration of strategy, operational planning, and program assessment. The CINCs' roles in this process are to continuously examine current, emerging, and future issues, threats, technologies, and force structures and to advise on how these issues impact on strategic planning. JSR products include JSR issue papers that are prepared jointly by representatives from the Joint Staff, the Services, and the CINCs. JSR issue papers discuss proposed changes to the Joint Planning Document, the National Military Strategy, and the Joint Strategic Capabilities Plan.

Joint Planning Document (JPD)—[JSPS]

The JPD is a document that advises the Secretary of Defense on programming priorities and requirements for his consideration during preparation of the Defense Planning Guidance. The JPD is published in 7 Volumes (Intelligence; Nuclear; Command, Control, Computers, and Communications (C4) Systems; Future Capabilities; Mapping, Charting, and Geodesy; Manpower and Personnel; and Logistics). Its purpose is to furnish insight on the Joint Chiefs of Staff's priorities in the development of the defense program then under consideration. The CINCs' roles are as consultants. They provide input as to what should be a priority and why.

National Military Strategy (NMS)—[JSPS]

The NMS is prepared by the Chairman of the Joint Chiefs of Staff in consultation with the other members of the Joint Chiefs and the CINCs. It is provided to the President, the National Security Council, and the Secretary of Defense. It recommends

a national military strategy and the force structure required (within fiscal limits) to support the attainment of the proposed strategy. The NMS includes:

(1) An appraisal of US Defense Policy as stated in the current Defense Planning Guidance and recommended changes.

(2) An updated intelligence appraisal (drawn from the JSR) that lists the threats to US national security.

(3) A discussion of ways to achieve our national security objectives.

The CINCs, as mentioned above, have a key role in the preparation of the NMS. After all, they are the ones on the scene throughout the world.

Defense Planning Guidance (DPG)—[PPBS]

The DPG is the major link between the PPBS and the JSPS. The DPG is issued by the Secretary of Defense to the military departments for development of the military departments' Project Objective Memorandums. The CINCs play an important role here because the Services are, essentially, being tasked in the DPG with supporting the CINCs (the war fighters). If the CINCs were excluded from this process, then the Secretary of Defense would not know what to have the various Services procure to support the CINCs' war fighting missions.

Program Objective Memorandums (POMs)—[PPBS]

POMs are submitted by the Services to the Secretary of Defense. POMs identify major issues that must be resolved during the year of their submission (even-numbered years). The POM process may be where the CINCs have the greatest impact/ influence. During POM development, the CINCs, through their Service component commanders, submit their requirements to the Services. The CINCs also submit their highest priority needs to the Secretary of Defense and Chairman of the Joint Chiefs of Staff. The individual Services are required to demonstrate in their POMs how they respond to the needs of the CINCs. The CINCs, in turn, have the opportunity to review all POMs to ensure the Services have paid attention to their needs.

Chairman's Program Assessment (CPA)—[PPBS]

The CPA is the Chairman's assessment of the composite POM. It summarizes the views the Chairman has on the balance and capabilities of the POM forces and support levels required to attain US national security objectives. The CINCs play an important role as advocates of their positions. They will consult with the Chairman on how well the POMs support (or do not support) them. Development of the CPA is a closely coordinated process involving the Services, the CINCs, the DOD agencies, and the Joint Staff.

Issues—[PPBS]

During the POM process, the CINCs can prepare alternatives to some of the programs included in the POM. These alternatives, along with others from the Office of the Secretary of Defense staff and the Office of Management and Budget, are considered by the Defense Planning and Resources Board. The Board selects a number of issues that will be reviewed by them, with the Deputy Secretary of Defense making the final decision. During the period of review, the CINCs are invited to meetings that consider the issues they brought up. Once the decisions have been reached on all issues Program Decision Memorandums (PDMs) are issued.

Program Budget Decisions (PBD)—[PPBS]

Program Budget Decisions are drafted following budget submission hearings. These decisions evaluate, adjust, and approve all resources in the budget request. The CINCs are allowed to comment, via the Defense Planning and Resources Board, on the budget request and may identify areas of concern and/or disagreement. They can also recommend alternatives. The Deputy Secretary of Defense makes the final decision on PBDs and forwards them to the CINCs and appropriate military departments/DOD agencies.

In addition to their formalized roles within the JSPS and the PPBS, the CINCs play an important, if not a major, role in weapons acquisition. The CINCs are the war fighters. They will employ the hardware procured by the Services. It is, therefore, important to them that their concerns be addressed in the acquisition of weapon systems. For example, the Commander in Chief, Central Command (CINCCENT), would not be pleased if the Air Force's latest fighter plane was not able to operate in a desert environment because that would preclude it from operating in his Area of Responsibility.

Finally, CINCs may be called upon to testify in front of Congress on issues concerning the defense budget. In this way, CINCs have the potential to make or break an important budget decision. Indeed, powerful testimony from a CINC, can have a tremendous impact on all sorts of issues, not just those concerning the budget or the force structure.

CINCs' Roles

I believe that the CINCs play two very important roles: customer and consultant. The CINCs do not administer and train forces, they employ forces provided to them by the various Services. The Services are responsible for the administration and training of the forces they provide to the CINC. Because of this, the CINCs must be good customers. They must advise the Services of what they need to do their missions and how the Services can support them in accomplishing their missions. The CINCs' avenue to do this is the Defense Planning Guidance via the Defense Planning and Resource Board. The Services respond with POMs that must address the CINCs' requests. As customers, the CINCs are also provided with the opportunity to change or modify POMs through Issue examination and Program Budget Decisions. In their roles as consultants, the CINCs provide information used in the formulation of the Joint Planning Document, the National Military Strategy, and the Chairman's Program Assessment.

Do CINC influences foreshorten or forestall planning views and decisions? I believe that it is obvious that they foreshorten, or, to use a better word, reduce planning views and decisions. CINC influences allow the customer of the DOD budget to get needed products in the accomplishment of the mission. By involving the CINCs in the processes that provide them with these products, the system works better. For example, if the CINCs were not involved—if they were just passive customers—then there is a risk that the forces provided to them will be

(Continued on middle of page 38)

Requirements Analysis Process in Design (RAPID) Researching and Developing Tools to Manage the Requirements Process

Captain William Zeck, USAF
Ms Janet Peasant

Introduction

Imagine this . . .

> You are the system program director of a major weapon system acquisition (let's call this system the Chemical Weapons Locator (CWL)). The CWL is needed by the special operations community to locate previously undetectable chemical weapons. Although chemical weapons have not been widely used, intelligence experts believe chemical weapons will become a popular tool of our adversaries. After eight years of research, analysis, and contracted development, the CWL program is nearing completion but is over cost and behind schedule. This situation is due to slower than expected development of a critical chemical detection sensor.
>
> Unfortunately for you and the CWL program, Congressman John Doe, while reviewing appropriations subcommittee reports, scans a memo detailing the CWL overruns. Congressman Doe, well known for his aggressive deficit fighting, immediately calls for formal hearings. He rallies like-minded friends on Capitol Hill and starts the ball rolling for a full scale Government Accounting Office (GAO) inquiry.
>
> Before you can say "early retirement," the GAO informs you that in three weeks you will be called to account for the CWL overruns and defend the program. Although early retirement sounds pretty good by now, you understand the threat and firmly believe that the CWL is essential to counter it. You gather your staff (you will need your entire team for this difficult and lengthy task) and begin to prepare for the impending onslaught of questions. At the same time, you begin to budget for the cost of the inquiry: the labor hours needed to identify the pertinent documents out of all those full filing cabinets; the cost of hiring contractors to validate the original studies; and the clerical costs to prepare formal responses to the GAO. The cost of the inquiry will further burden the CWL budget, and after discussion with your staff, you are not sure they can locate the original documents that justify CWL development and costs. As program director, your believe your chances for promotion are taking a decided turn for the worse.
>
> As you drive home, you wish you had access to one source that tied together all of the mission requirements to the threat. You also wish for clear rationale for every performance parameter of the CWL. You wish you had a "requirements guru" or a "magic" system that could give you all the answers.

RAPID, a requirements management software tool, under development by Armstrong Laboratory, is focused on granting your wish.

What is RAPID?

The RAPID tool (short for Requirements Analysis Process in Design for Weapons Systems) is part of a research project underway at Armstrong Laboratory. RAPID will enable weapon system managers to manage the operational requirements process more effectively and efficiently by providing structured automation of the process the Air Force uses to acquire new operational capabilities.

The remainder of this article will be divided into four parts. The first part describes the basic requirements process; how an operational deficiency is recognized and then defined as a mission need. The second part explains the RAPID functions that will become available for user evaluation. The third part explains RAPID's concept and technical architecture. The final part presents plans for continued RAPID development.

The Requirements Process

What is the requirements process? At the basic level, the requirements process is the process by which the military identifies the weapons it needs to fulfill its ultimate mission: ensuring the security of the United States. The military uses a Strategy-to-Task requirements process. The Strategy-to-Task requirements process only initiates a new-start weapon system acquisition to satisfy an operational deficiency. In other words, the requirements process is only a means to increase our capability to achieve operational objectives, but not to develop

a particular weapon system with certain performance features.

Using the Strategy-to-Task framework, the requirements process ultimately begins with the President's annual *National Security Strategy of the United States*. This document outlines our national goals and how our nation's power can be used to achieve these goals. It is formulated based on US interests at home and abroad and the threats to those interests. Some examples of national security objectives might include:

- Maintain ready access to world energy supplies.
- Deter, or should deterrence fail, defeat aggression against the US, its allies, and friends.
- Counter threats short of war to the security of the US and its citizens and interests, including terrorism.

Based on the President's annual *National Security Strategy of the United States*, the Secretary of Defense and the Chairman of the Joint Chiefs of Staff produce the *National Military Strategy* and the *Defense Planning Guidance* (DPG). These documents provide the military with guidance for planning their role in supporting the President's annual *National Security Strategy of the United States*.

Next, the theater commanders in chief (CINCs) use the guidance from the *National Military Strategy* and DPG to produce regional and global plans that task the services with specific missions and goals. (1:2) From these operational plans (OPLANs) and other guidance, the Joint Chiefs formulate the *Joint Strategic Capabilities Plan* (JSCP). The JSCP provides strategic concepts to support the military objectives derived from national security objectives and provides an outline of the capabilities of US Armed Forces; these capabilities are based on real world constraints.

The Air Force uses guidance from all of the above documents to perform Mission Area Assessment (MAA). MAA identifies all of the mission needs generated by the CINCs' OPLANS. The MAA describes all of the missions the Air Force is responsible for undertaking in pursuit of US national security objectives.

After the MAA is complete, the Air Force performs Mission Needs Analysis (MNA). The MNA evaluates the Air Force's ability to accomplish the tasks and missions identified in the MAA using current and programmed weapon systems. (1:2) During the MNA process, major commands (MAJCOMs) analyze the force structure, geopolitical situation, and expected threats and determine if any operational deficiencies exist. (2:1) If a deficiency exists, MAJCOMs must assess whether a change in tactics, doctrine, or training will overcome the deficiency. If not, a material solution must be sought, and the responsible MAJCOM must generate a Mission Needs Statement (MNS) to document the request for a new system or a modification to an existing system.

After the MAJCOM writes a MNS and the Air Force Chief of Staff approves the MNS, the Air Force has a validated need. Remember, under the Strategy-to-Task concept, this need exists because the Air Force lacks a capability to perform some mission deemed necessary to support our national security strategy, not to justify a particular weapon system with a certain set of performance parameters. If a nonmaterial solution is infeasible, the Air Force satisfies the need by procuring a new weapon system or modifying an existing system. A Cost and Operational Effectiveness Analysis (COEA) is performed on all of the alternatives with the potential to satisfy the need. (3:1) The originator of the need uses the COEA to help choose the preferred alternative. (3:1) The need is then decomposed into a set of requirements to define a new system or modification with the ability to satisfy the need. This set of requirements is then defined in the Operational Requirements Document (ORD).

For example, the Air Force may identify a need to deliver weapons with pinpoint accuracy, deep behind enemy lines, and within 30 minutes of target selection. To satisfy that need, the Air Force may propose a new drone. The drone becomes a requirement to fill the need for ordinance delivery with pinpoint accuracy, deep behind enemy lines, and within 30 minutes of target selection. The drone requirement can be further decomposed into requirements for speed, range, bomb load, etc.

Mission Area Plans (MAPs) are a relatively new product of the requirements process. A MAP is the ultimate planning product of the MAA/MNA process. A MAP covers a 25-year period and documents the most cost-effective means of correcting operational deficiencies from among nonmaterial solutions (change in tactics, doctrine, or training), changes in force structure (numbers and types of operational units), system modifications, science and technology applications, and new acquisitions. (2:1) MAPs are written by integrated product teams (IPTs) made up of Air Force user commands, Air Force Materiel Command (AFMC), national laboratories, and the independent research efforts of academia and industry. (2:1)

The President's guidance, the Secretary of State's guidance, and the Joint Chief of Staff's guidance along with the MAAs, MNAs, and MAPs serve as rationale for needs and requirements.

The ultimate product of this complex and lengthy requirements process is the procurement or modification of weapons systems needed to support the *National Security Strategy of the United States*.

Air Force Program Directive (AFPD) 10-6, *Mission Needs and Operational Requirements,* provides a thorough explanation of the requirements process and Air Force Instruction (AFI) 10-601, *Mission Needs and Operational Requirements Guidance and Procedures*, provides guidance and procedures for developing and processing Air Force mission needs and operational requirements. (3,1)

Figure 1 shows a simplified flow of the Strategies-to-Task

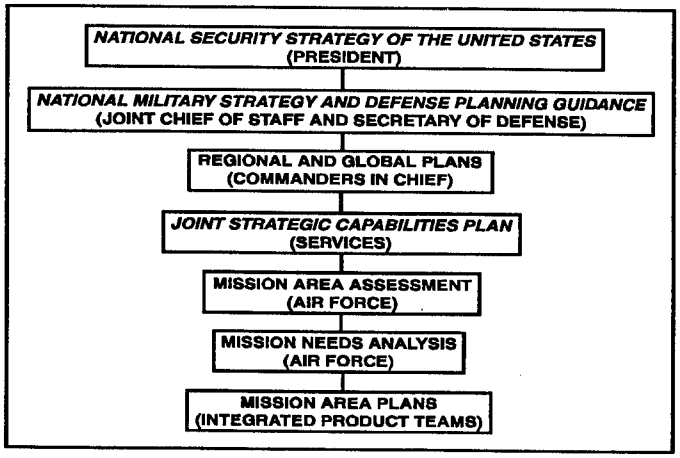


Figure 1. Basic Strategy-to-Task Framework

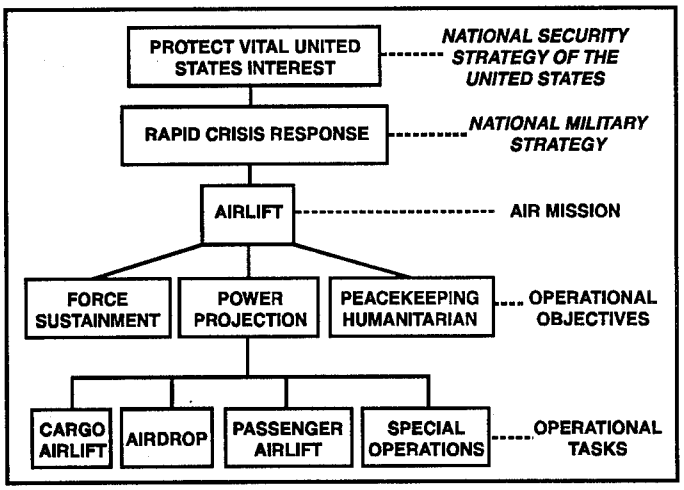


Figure 2. Strategy-to-Task Example

framework and Figure 2 shows an example of the framework.

What RAPID Will Do for the User

RAPID will help the user solve many of the problems associated with the current requirements process. RAPID will be valuable to a broad range of users. The MAJCOM requirements people can use RAPID to develop requirements and produce the necessary documents associated with new starts and modifications. The Aeronautical Systems Center (ASC) program development managers can use RAPID to help MAJCOMs refine their weapon system requirements. Similar to ASC, the Air Force Studies and Analysis Agency can capture analytic results and resultant program decisions and assumptions. System program directors can use RAPID to justify program tradeoff decisions. RAPID is flexible enough to be used by anyone involved in the acquisition of weapon systems. In fact, RAPID could easily be used for management of commercial product development.

More specifically, RAPID was designed to overcome the following difficulties associated with the requirements process:

- Loss of design rationale.
- Lack of clarity in design goal determination.
- Lack of clarity in definition of system constraints.
- Traditional focus on a system's capability instead of combat capability.
- Loss of Strategy-to-Task as rationale for system development.
- Use of the integrated product team approach to the requirements determination and analysis process.

How does RAPID overcome these difficulties? It overcomes requirements process difficulties by providing the user with an integrated system that will perform the following functions:

- Requirements Capture.
- Requirements Decomposition.
- Requirements Traceability.
- Rationale Capture.
- Rationale Traceability.
- Linkage of Analysis to Requirements.
- Document Generation.
- Document Management.

The RAPID Concept and Technical Architecture

The Air Force lacks a standard automated tool to support the documentation, management, and tracking of weapon system requirements. A variety of tools exists that support aspects of these functions, but they have been designed for the analytical user community (systems engineers, reliability engineers, and computer analysts). No single tool has been designed to support the military operational requirements community. This community differs from the analytical user community because it is comprised of professional weapons system operators, whose focus is strategy, tactics, and the employment of weapon systems, and the professional acquisition managers, whose focus is funding, contracting, and integrating new weapons into the nation's arsenal. Armstrong Laboratory Logistics Research Division, supported by Sumaria Systems, Inc., is the first to perform research and development that will fill this void in the requirements management tool kit.

The RAPID concept is to develop a software tool to support Air Force operational requirements. RAPID will capture, store, and retrieve weapon system requirements; allow users to completely define, trace, and attribute weapon system requirements; enable consistent and rigorous analysis of weapon system requirements; manage weapon system requirements; and establish a knowledge based corporate memory of weapon system requirements throughout the design, development, and production process.

RAPID is hosted on personal computers with 486 or Pentium microprocessors and the Microsoft Windows NT operating system. The RAPID application employs Microsoft Visual C++, an object oriented graphical programming language, and the Microsoft Foundation Classes. RAPID persistent object storage is provided by ObjectStore, a commercial object oriented database management system. Document processing capabilities are provided through a customized version of Microsoft Word 6.0 for Windows NT.

The Graphical User Interface (GUI) provides the "face" of RAPID to the user. The user will access all of RAPID's functions through the GUI. The RAPID GUI provides menus, menu pull downs, and icons to access all RAPID functions. Because the GUI largely follows Windows' conventions, any user comfortable with Windows should be very comfortable with RAPID. The GUI also provides a comprehensive help function that includes help by topic as well as context sensitive help.

The RAPID technical architecture in Figure 3 depicts RAPID's four main modules:

(1) Login.
(2) Requirements Generation.
(3) Document Generation.
(4) Configuration Management.

The following paragraphs briefly discuss the basic functionality of each of these modules.

Login

The login function provides user access control and the selection of a RAPID database. Through system administration, users are created, assigned passwords, and given specific module

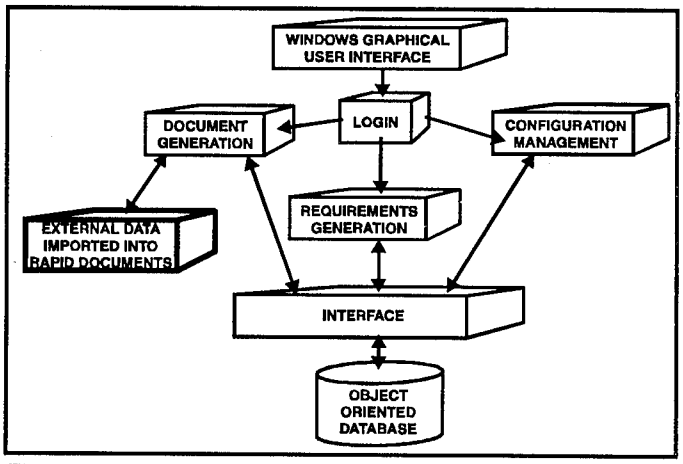


Figure 3. Requirements Analysis Process in Design (RAPID) Architecture

access privileges. In subsequent sessions, users can change passwords and profile information.

Requirements Generation

The requirements generation module prompts the user to define a requirement and then enables the user to link it to the military need and other related requirements. The RAPID GUI provides intuitive screens that prompt the user for all pertinent information such as rationale, units of measure, minimum and maximum tolerance, tests and evaluation criteria, as well as threshold and objective values. Users can identify a requirement as a key parameter, and this pre-formats the requirement for inclusion into a formal acquisition documents like the Operational Requirements Document and the Requirements Correlation Matrix. The system automatically tracks the authorship of each requirement.

A primary research contribution of the RAPID project is the examination of the structure of a requirements data set. The RAPID requirements generation module enables the definition and storage of requirements data set into the ObjectStore database. The ObjectStore database schema model implements a requirements specification language (RSL) developed specifically for RAPID and the RAPID user community. Through the RSL, predefined requirements domain objects, logical relationships, and processing routines reduce the burden on the user to continually define original relationships and processes between and among requirements. The usefulness of this structure will be tested by users during a period of beta testing using actual weapons systems acquisition data.

Document Generation

The document generation function assists the user in producing the documents associated with the requirements process. All document processing is performed within Microsoft Word 6.0 for Windows NT. Document templates are used to produce actual program-specific documents. Templates for the most common requirements documents provide the capability for users to easily create documents. Users can also define additional templates. Templates are stored within the RAPID database and can be easily controlled by the systems administrator. Further, information tagging routines within the Requirements Generation module enable users to relate requirements statements with document sections. Later, when a document is generated, users can automatically enter groups of tagged requirements or review groups and select the appropriate requirements. Summary information on a document will also list the requirements that have been embedded into a document. Documents are saved to the RAPID database instead of in an ad hoc directory. Users may also decide to place documents under formal configuration control. This method stands apart from password protection in that documents are always available to users with similar access rights.

The RAPID document generation design takes advantage of the personal computing environment by enabling the capture of a wide range of complex data; for example, documents, graphics, spreadsheets, and data sets derived from cost models or simulations. Within the RAPID database, users can maintain configuration control of these information elements without the requirement to continue to link to other applications and directories. This will foster data integrity over the life span of an acquisition program.

Configuration Management

The user is free to edit and update documents while they are in the work area without formal justification. Once a user is satisfied that an item is complete, the item is marked as "Pending Approval." The configuration manager can review and either approve or reject candidates to the configuration baseline. Once an item is baselined, it can no longer be changed without a user providing a formal reason for the change. In this manner, the configuration management module provides visibility into how requirements, documents, and other RAPID information objects have changed over time. This is an important aid in the creation of a formal record of the comments and direction provided by a broad range of users and acquisition decision-makers. This module is expected to offer additional functions as users beta test the RAPID software and make suggestions for improvements.

Continued RAPID Development

Armstrong Laboratory and Sumaria Systems, Inc. are developing RAPID under a four-year contract scheduled to conclude in September 1996. RAPID is being developed in three phases:

(1) Planning. The requirements process was analyzed and modeled and different technological solutions to the RAPID research goals were assessed. This phase generated the current RAPID operational concept outlined in this paper.

(2) Basic Capabilities Thrust. The RAPID team has developed the capability to demonstrate the RAPID concept of operations in a stand-alone mode on 486 and Pentium-based personal computers under a Windows NT environment.

(3) Advanced Capabilities Thrust. The RAPID team will develop capabilities for requirements consistency and completeness checking. The team will also design methods to widen RAPID use from stand-alone operations to local and wide-area accessible, multiparty collaboration.

A planned advanced development effort is focused on building a testable collaborative RAPID. This effort is expected to begin in August 1996 and will include wider user testing of the stand-alone system as well as the collaborative platform.

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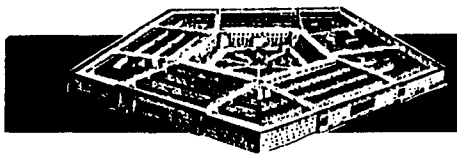

USAF Logistics Policy Insight

New Policy for Ozone Depleting Substances

New Ozone Depleting Substance (ODS) Policy and Waiver Procedures will hit the streets shortly. The policy establishes direct HQ USAF oversight and integration of Air Force efforts to manage the risks posed by a rapidly diminishing supply of Class I ODS. All organizations with formal documents (technical orders) requiring the use and/or purchase of ODS must have a HQ USAF-approved waiver to continue use. HQ USAF will not approve waivers for any Class I usage not specifically required by at least one formal document. Such usage must be terminated immediately. The policy establishes four types of waivers: (1) Individual contract waiver, (2) MAJCOM-Wide Facility Refrigeration and Fire Suppression waiver, (3) Air Force-Wide ODS Recovery, Recycling, Reclamation, and Reuse waiver, and (4) Air Force-Wide "Use" waiver. (Lt Col Munley, HQ USAF/LGMM, DSN 225-0844)

USAF Space Logistics Normalization Policy

Air Force space maintenance policy was recently established in AFI 21-108, *Maintenance Management of Space Systems*. This document requires the use of standard automated DOD logistics systems to meet operational requirements. Existing operations and maintenance contracts are being modified to reflect new Air Force policy. Action teams are developing metrics and establishing cost reduction programs for candidate systems. Metrics under consideration will capture the costs of depot-level reparables, operations and support, and depot maintenance. (Lt Col Faulk, HQ USAF/LGMW, DSN 227-0771)

Base Support Planning

AFI 10-404, *Base Support Planning*, para 3.3, will be revised to included the following guidance regarding the responsibility/ role of the Air Force component command in the base support planning (BSP) process. The Air Force component command will be responsible for sponsoring, hosting, and funding BSP Part 2 planning conferences. Included are BSP Part 2 planning conferences for installations not included in the commanders in chief's (CINC's) operations plans. The component command should establish the guidelines and structure for the planning conferences. Recommended participation of deploying units, proposed team composition, and any restrictions imposed on team size should be included. (Ms Kennedy, HQ USAF/LGXX, DSN 227-2831)

Joint Issues

As reported in *Defense News*, 28 August 1995, "After a year long study on the purpose of the services by the Commission on Roles and Mission (CORM), US Defense Secretary recommended to make the Joint Staff more powerful." This statement is an indication of the future and continued role of "Joint Operations" in the US Armed Forces. Additionally, the emphasis to speed up the development of joint Command, Control, Communications, Computers, and Intelligence (C4I) to enhance joint operations underlines the increased importance that joint operations will play in all future contingencies. The Chairman, Joint Chiefs of Staff has instituted a Joint Readiness Reporting System designed to provide him with an assessment of war fighting readiness from the joint perspective. As resources become scarcer, we will continue to move toward maximizing jointness for both support and operations. (Maj Navarra, HQ USAF/LGXX, DSN 227-1292)

Air Force Deployment Pamphlet

When AFI 10-403, *Deployment Planning*, was published containing much less specific procedural guidance than its predecessor, AFR 28-4, *USAF Mobility Planning*, the decision was made to follow AFI 10-403 with a document that captured some of the processes and procedures that had proven successful in the past. That document is the Deployment Pamphlet. The information in the pamphlet is designed to assist units in carrying out their responsibilities outlined in AFI 10-403. It is a nonregulatory document, and as such, units are not required to comply with any of the processes defined within. Publication is expected by December 1995. (Wg Cmdr Williams, HQ USAF/LGXX, DSN 227-1527)

Support Agreements Update

The new DoDI 4000.19, *Interservice and Intragovernmental Support*, has finally been approved and became effective 1 October 1995. The HQ USAF/LGXX implementing instructions for the DoDI have been issued. We plan to circulate a first draft of the updated AFI 25-201, *Support Agreement Procedures*, to MAJCOMs this Fall. The other main news is that although progress with the Support Agreements Management System (SAMS) new 4.0 standard has been delayed by higher priority work at the Air Force Logistics Management Agency, we still expect to have this user-friendly, networked version in service by early 1996. (Wg Cmdr Williams, HQ USAF/LGXX, DSN 227-1527)

Air Force Logistics Strategic Plan Update

This Fall the Air Force Logistics Strategic Plan (AFLSP) will start to be updated. The update process will be much the same as the last update with participation by members of the logistics staff from each MAJCOM. But this update will be different from the last in two important respects. First, the Air Force-level plan will account for the logistics deficiencies documented in each major command's mission area plans. Second, there will be a stronger link between strategies in the plan and the resources required to achieve them. This will be documented in an automated Strategic Planning and Resources Tool (SPART), which many of the MAJCOMs already have. The AFLSP update will kick off after approval of the update plan at the Air

Force Logistics Board of Advisors meeting in October. (Lt Col McVinney, HQ USAF/LGXX, DSN 225-9824)

Reinventing Air Force Distribution

The Express Delivery Reinvention Lab (EDRL) was chartered in 1994 by the Secretary of the Air Force. This joint United States Air Force/Defense Logistics Agency/United States Transportation Command team is reinventing Air Force distribution processes. Their mission is to adapt and apply state-of-the-art express delivery practices for defense logistics activities. The goal is a lean, robust pipeline built around the concept of "door-to-door delivery."

Among EDRL initiatives is the Transportation Standard Industry Information Processor (I2P) program. I2P gives Air Force base shipping activities access to express carrier services from a Cargo Movement Operations System (CMOS) terminal and produces a standard industry shipping label. The label contains information required for movement by express carriers as well as within the Defense Transportation System.

The I2P initiative was successfully prototyped at Eglin AFB, Florida and Shaw AFB, South Carolina, beginning in August 1995. The Air Force is currently evaluating the new capability for CONUS-wide implementation. (Maj Wakeley, HQ USAF/LGTR, DSN 227-7332)

Reengineering the Department of Defense Personal Property System

A joint Department of Defense (DOD) team, consisting of representatives from each of the military Services, the Coast Guard, and the Army's Military Traffic Management Command (MTMC), has been tasked by the United States Transportation Command to reengineer the personal property transportation process. This "quality of life" initiative established goals to provide DOD personnel with commercial quality moves, on-time pick up and delivery, and damage-free shipments.

The concept currently under consideration for adoption involves the use of full-service contracts. Under the proposed plan, MTMC will competitively select contractors, on a long-term basis, to provide full-service personal property movement to all areas of responsibility (AOR) each installation services. Contractors may submit offers to provide required transportation services from an origin AOR to single or multiple destinations or channels. MTMC intends to award contracts for each of the approximately 89 channels serviced by each installation to one or more contractor based on those proposals which offer the best overall value to the government. The specific evaluation criteria will generally relate to each contractor's approach to satisfying service requirements, past performance, and price.

Transportation-related services under the current proposal include complete movement services from origin to destination, direct claims settlement with the contractors, full replacement value protection against loss and damage, management information reports, intransit visibility, storage-in-transit, and Customs clearance. A pilot program is planned for the Fall of 1996. (Maj King, HQ USAF/LGTT, DSN 227-1078)

Reengineering Department of Defense Travel

The Department of Defense has reengineered a simplified temporary duty travel system. It is oriented toward mission accomplishment and the customer, will cost less to administer, equalizes military and civilian allowances, and uses best business practices. The new system is currently under a one-year pilot program within the Department of Defense, which includes Air Force activities at Bolling AFB, Washington DC; Langley AFB, Virginia; Dover AFB, Delaware; Peterson AFB, Colorado; and Randolph AFB, Texas. Worldwide implementation of the new requirements is scheduled to begin in January 1997. The key points of the new program are:

- Travelers will make all travel arrangements through a full-service commercial travel office featuring one-stop customer shopping.
- Government sponsored travel charge card is maximized.
- Simplified rules streamline the travel process. Budget and expense approval is given to commanders and supervisors.
- Data will be entered once, regardless of source, and all levels will rely on electronic records rather than paper documents.

(Mr Grier/CMSgt Kelly, HQ USAF/LGTT, DSN 227-9560)

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Conclusion

In today's environment of rapid change, reduced manpower, and reduced military spending, the Air Force must develop innovative approaches to manage the complex, expensive, and time-consuming requirements process. Team-based requirements development is one means to lessen the time to field a more useful system that closely matches user needs. RAPID will provide a way to make requirements processing available to the acquisition team and take the Air Force requirements process into the next century.

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A Proposal to Restructure the Logistics Group

Lieutenant Colonel Michael R. Van House, USAF

Introduction

A changing world situation has produced political and economic pressures that have forced the US Air Force to downsize. Rather than simply reduce all organizations within the Air Force, General Merrill McPeak, then the Air Force Chief of Staff, sought to use the downsizing as an opportunity to restructure the Air Force. All levels within the Air Force from the Air Staff to the lowest levels, experienced some type of organizational change. At wing level, a new group structure was developed, and efforts were made to give commanders the authority, responsibility, and capability to do their jobs by placing the resources necessary for mission accomplishment under their command.

I believe that the recent restructuring of the Air Force did not go far enough. There are forces and programs currently in being that will change existing procedures in Air Force logistics. Logisticians must be aware of the impact of these forces and programs and develop a new organizational structure for the Logistics Group that will meet the needs of tomorrow's Air Force.

This paper will familiarize you with the current structure of a wing Logistics Group, analyze some of the major programs that are changing Air Force logistics, and discuss how those programs will impact the Logistics Group. Several concepts of organizational design theory will then be explored to form a base of knowledge and provide a model as an initial step toward designing a new group structure. After determining the key functions of the Logistics Group, each squadron in the group will be explored to determine which squadron tasks are essential and which should be abolished or moved. Finally, this paper will propose a new Logistics Group structure which postures the group to meet the challenges of the future.

The Objective Wing

The objective wing divides base forces into four groups along functional lines. (1:13) An Operations Group was formed that operates the wing's primary mission equipment. In addition, organizational-level maintenance, or on-equipment maintenance was moved from the old Deputy Commander for Maintenance function to the Operations Group to give the group and squadron commanders complete control over their mission equipment. The Logistics Group merged many of the functions of the old Deputy Commander for Maintenance and Deputy Commander for Resources organizations. It was to support the wing with materiel and resources such as intermediate-level maintenance, supplies, fuel, as well as transportation and contracting services. The functions of the former Combat Support Group and Communications Squadron were combined into a Support Group. This group provides base support and services such as civil engineering support, communications, security, and other base recreation and mission services. The final group in an objective wing is the Medical Group. This group centralizes all base medical activities and services that support the wing.

Most of the organizational changes associated with the objective wing conversion occurred at the group level and above. The Operations Group, however, implemented organizational change down to the squadron level. As mentioned earlier, the organizational-level maintenance function was incorporated into the operations squadrons to structure them as deployable, war fighting units. This change postures the Operations Group and its squadrons to meet the challenges and forces of the future. The same is not true of the Logistics Group.

The Logistics Group ended up being a compilation of what was left of the intermediate maintenance function, the staff functions within the old Deputy Commander for Maintenance organization, and the squadrons in the old Deputy Commander for Resources organization. I believe that although it made sense to align these functions together into a Logistics Group, there must be a broad organizational awareness of the political and economic forces that have, and will continue, to change the way Air Force logistics operates in the future. The Air Force restructure needs to be carried one step further—to restructure the Logistics Group—to be of greatest service to supporting the combat arm. To start this process, the current Logistics Group structure will be presented in the next section.

The Current Logistics Group Structure

The Logistics Group is made up of five squadrons (Figure 1): a Maintenance Squadron, a Logistics Support Squadron, a Supply Squadron, a Contracting Squadron, and a Transportation Squadron. (1:14) The current functions within each of the squadrons will now be examined.

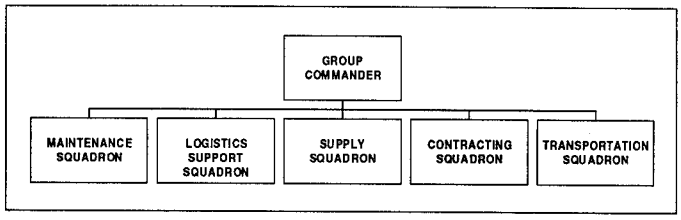

Figure 1. Current Logistics Group Structure

Maintenance Squadron

A typical Maintenance Squadron is made up of nine flights (Figure 2): Accessories Flight, Avionics Flight, Armament Flight, Munitions Flight, Propulsion Flight, Fabrication Flight, AerospaceGround Equipment (AGE) Flight, Maintenance

Flight, and Test Measurement Diagnostics Equipment Flight. (1:15) The various activities of the Maintenance Squadron can be roughly grouped into five different tasks. Five of the flights (Accessories, Avionics, Armament, Munitions, and Propulsion) perform intermediate-level maintenance on various aircraft systems from engines and hydraulics to communication-navigation systems and weapon release systems. Hence intermediate-level maintenance of aircraft systems is one task. The second task is fabrication. This encompasses the inspection, repair, manufacturing, and testing of aircraft structures and components including survival equipment. The storage, maintenance, and total management of aerospace ground equipment makes up the third squadron task. The fourth task is servicing transient aircraft. Finally, the fifth task is the repair and calibration of test measurement diagnostics equipment.

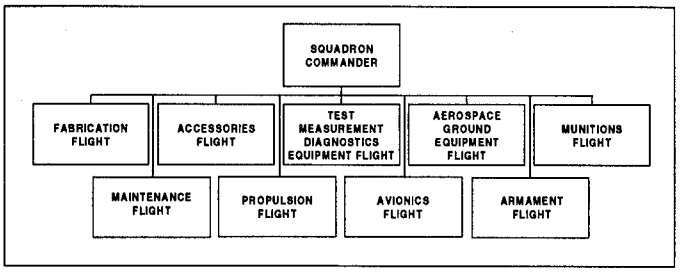

Figure 2. Current Maintenance Squadron Structure

Supply Squadron

A Supply Squadron is generally made up of five flights (Figure 3): Materiel Storage and Distribution Flight, Management and Systems Flight, Materiel Management Flight, Fuels Management Flight, and Combat Operations Support Flight. (1:16) There are roughly six different tasks in a Supply Squadron. Probably the most visible task is the physical handling of the property. This includes the receipt, storage, and delivery of the property. The second task is inventory management, which involves the management of stock levels and the reordering of materiel from various sources of supply. Like inventory management, a retail sales task is located within the Materiel Management Flight, but is really a separate task all together. This task involves operating a retail outlet for individual equipment such as military specific clothing, cold weather clothing, and flight gear, as well as for office supplies and commonly used cleaning supplies and tools. A fourth task of a Supply Squadron is to provide fuel and cryogenics products to various users. Management of fuel levels, the quality of the fuel products, the issue of fuel products, and user maintenance of the fuel vehicle fleet are all included in this task. The Combat Operations Support Flight currently performs the fifth task of the Supply Squadron—to provide service to the customer. Included in this task are the processing of customer requirements for parts, managing deployable spares kits, processing parts that are turned in by the customer, and operating forward parts stores that support the customer's mission. The final task of the Supply Squadron is an internal task that enables the squadron to perform its other tasks satisfactorily—data management. Elements of this task include inventorying stock to ensure the accuracy of account balances, storing auditable documents, maintaining a computer database, and producing management products. There

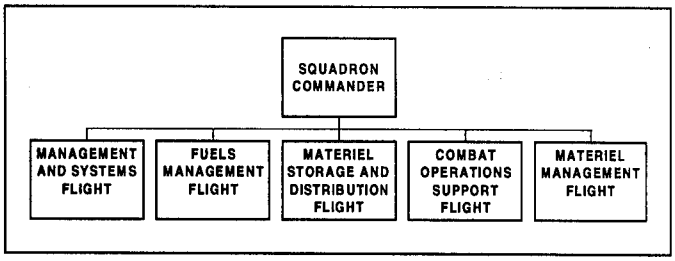

Figure 3. Current Supply Squadron Structure

is also a surveillance function included in this task to ensure the proper functioning of the squadron.

Transportation Squadron

The Transportation Squadron (Figure 4) is broken into four flights that perform four basic tasks. (1:16,13) The Vehicle Operations Flight manages and operates the base vehicle fleet. This task involves fleet management, or the process of ensuring optimal use of the vehicle fleet, as well as programming replacements at the end of their useful life. Freight and passenger processing is the squadron's second task, and it is performed by the Traffic Management Flight. Processes such as packing and crating property for movement, surface freight operations, and air freight operations are included in this task. Also included are the scheduling of passenger movements and personal property shipments. The Vehicle Maintenance Flight performs the third task in the Transportation Squadron; to provide maintenance services for most government owned special and general purpose vehicles. The Combat Readiness and Resources Flight performs a variety of staff services for the Transportation Squadron such as squadron mobility, planning, and budgeting. The primary task for this flight, and the last major responsibility of the squadron, is to manage cargo and passenger processing for the base wide mobility process.

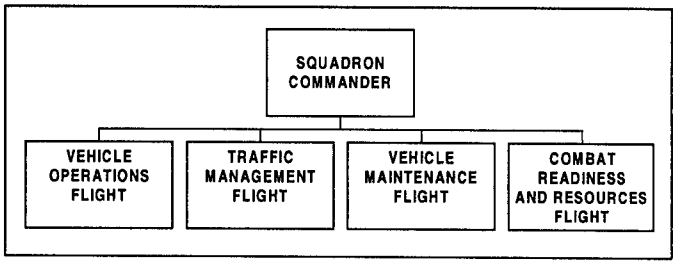

Figure 4. Current Transportation Squadron Structure

Contracting Squadron

A Contracting Squadron is divided into four flights (Figure 5): Construction Contracting Flight, Commodities Contracting Flight, Services Contracting Flight, and Management Analysis and Support Flight. (1:17) These flights are functionally aligned by the type of contracting service they provide. (4) The Construction Contracting Flight provides construction and maintenance contracting services. Any construction project or maintenance project to any real property that is not done organically by civil engineering will be contracted for by this flight. Similarly, the Commodities Contracting Flight provides contracting services for base customers who require the local purchase of supplies or equipment. The Services Contracting Flight provides contracting expertise to purchase various

services such as waste collection, grounds maintenance, or hazardous waste disposal. The last flight is the Management Analysis and Support Flight whose task it is to provide the Contracting Squadron with automated data processing services, store data from various contractors, and provide a management analysis function for the squadron commander. Despite the flight breakout designed to provide better management of contracting services, it is plain to see that the Contracting Squadron has one basic task—to provide the base with a variety of contracting services.

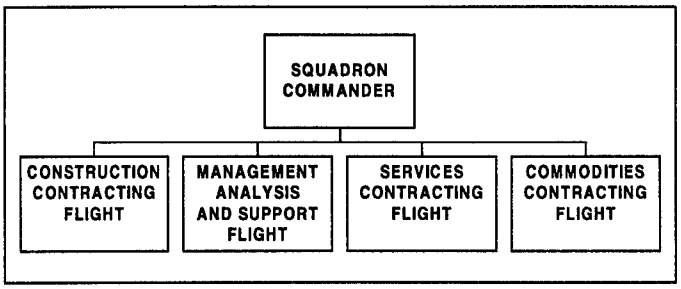

Figure 5. Current Contracting Squadron Structure

Logistics Support Squadron

One squadron in the Logistics Group that was created in conjunction with the objective wing conversion is the Logistics Support Squadron (Figure 6). It is made up of many of the staff functions that were included on the old Deputy Commander for Maintenance staff. There are three flights in this squadron: Logistics Plans Flight, Maintenance Training Flight, and Maintenance Operations Flight. (1:14)

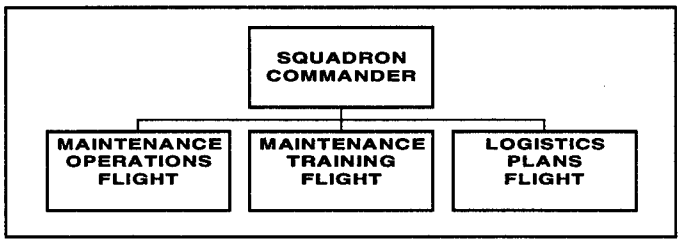

Figure 6. Current Logistics Support Squadron Structure

The Logistics Plans Flight coordinates logistics issues in the various mobility and contingency plans of the wing. This flight also coordinates and maintains host tenant support agreements for the wing. The Maintenance Training Flight provides maintenance training for all wing maintenance personnel including aircraft battle damage repair training. When Air Force Engineering and Technical Service personnel are assigned to a wing, they are usually aligned under this flight. Finally, the Maintenance Operations Flight tracks engine status for all assigned engines, coordinates Logistics Group inputs to the wing's flying schedule, and performs a maintenance analysis function for the group commander. The flight also is responsible for handling financial, personnel, and facility issues for the group. Although this squadron provides a variety of services for the Logistics Group, it has no overriding critical task that it performs for the group. Rather, it performs an accumulation of minor tasks and functions as the group commander's staff.

Hopefully, you now have a familiarity with the existing Logistics Group structure and the tasks that each squadron performs. In the next section I will detail the forces and programs that will soon drive the need for the group to reorganize to remain an effective and efficient organization.

Forces for Change

The same political and economic forces that drove the Air Force as a whole to downsize and restructure have affected the logistics community. In recent years, faced with the prospect of leaner budgets, the Air Force has looked for ways to rethink logistics support for its weapon systems. In order to cultivate efficiency and reliability, reduce manpower and equipment, and shrink spare parts inventories, the Air Force initiated three programs that are changing Air Force Logistics. These programs, Reliability and Maintainability 2000, Two-Level Maintenance, and Lean Logistics, will ultimately force a restructuring of the Logistics Group.

Reliability and Maintainability 2000

In the early 1980s, the Air Force had a huge burden in logistics. More than one-third of Air Force manpower was devoted to the maintenance of weapon systems. (9:22) Similarly, the Air Force had billions of dollars tied up in spare parts for these weapon systems. In an effort to reduce this logistics overhead, the Air Force created the Reliability and Maintainability 2000 (R&M 2000) program. The R&M 2000 program had five goals:

(1) Increase combat capability.
(2) Decrease the vulnerability of the combat support structure.
(3) Decrease mobility requirements.
(4) Decrease manpower requirements.
(5) Decrease costs. (9:22)

This program was incorporated into the weapon system acquisition cycle by making reliability and maintainability requirements equal to cost, schedule, and performance requirements for new weapon systems. (9:22) Reliability and maintainability were also stressed in weapon system modification programs.

The results of this program have been phenomenal. Before R&M 2000, as a young lieutenant, I spent much of my time in the Supply Squadron at Grand Forks AFB, North Dakota, chasing spare parts for B-52s in an effort to keep the mission capable rate around 38 percent. After many reliability and performance upgrades, B-52s flew 1,600 sorties in Desert Storm and maintained an average mission capable rate of 81%. (8:56) Air Force aircraft flew a total of 65,000 sorties during Desert Storm and maintained an average mission capable rate of an incredible 92%. (8:56)

The B-2 is another good example of an R&M 2000 success story. The B-2 has a computerized on-board test system that monitors aircraft performance as well as detects and isolates system failures. As a result of efforts which built reliability and maintainability into the B-2, the maintenance man-hours per flying hour have been reduced from 50 to 34.5. (8:57)

Finally, by reducing the manpower, support equipment, and

spare parts required to support Air Force aircraft, their mobility footprint will be greatly reduced. Today it takes seventeen C-141 aircraft loads to deploy a squadron of F-15s to a distant site. To deploy a similar squadron of the next generation F-22s will require only eight C-141 loads. Where 25 people are needed to support every F-15, only 15 will be required for every F-22. Lastly, and probably most importantly, an F-22 will average 8.5 combat sorties between major maintenance actions, while the F-15 averages only 5.4 today. (8:56) Good reliability and maintainability has already reduced the Air Force's dependence on large combat support structures, improved the mobility of forces, and reduced the number of people and spare parts required to support deployed aircraft. (8:56) This trend can be expected to continue in the future.

Two-Level Maintenance

Air Force organizations have traditionally followed a three-level approach to maintenance. What could be repaired on the aircraft was repaired at the organizational level. If the item could not be repaired on the aircraft, it was removed and replaced with a functioning unit and sent to a repair shop. This process is referred to as intermediate-level repair. In those cases where the repair shop was unable to make the required repair, the unit was sent to the depot to be overhauled or condemned.

The intermediate-level repair capability necessitated a substantial investment in people, spare parts, test equipment, and environmentally controlled facilities. (3:43) Due to the growing reliability of aircraft systems, and to reduce costs, release manpower, and minimize the mobility footprint, the Air Force adopted a two-level maintenance policy. (12:8)

Under the two-level maintenance concept, if an item cannot be repaired on the aircraft, it is replaced and sent to the depot to be repaired or condemned. Adopting this policy reduces the number of intermediate-level maintenance personnel required at wing level, reduces the investment in support equipment, and reduces the inventory of repair parts.

Not all aircraft systems currently follow a two-level maintenance concept, however. Some older systems such as the APG-63 radar on the F-15C/D, that do not have high enough reliability will still maintain three levels of maintenance for the near future. All new aircraft programs such as the B-2, however, are being designed to operate within two levels of maintenance. (7) In the future, the Air Force can expect more reliable aircraft systems, more systems adopting a two-level maintenance philosophy, and less reliance on intermediate-level maintenance.

Lean Logistics

In order to support the post cold war Air Force with a smaller, more efficient logistics system, the concept of Lean Logistics was established. Lean Logistics is basically the adaptation by the Air Force logistics system of many of the current business practices commercial firms claim allow them to operate responsively and efficiently. (5:2) Lean Logistics replaces historical Air Force reliance on large stocks of spare parts with a reliance on an extremely responsive repair and distribution system. (11:1) By using Lean Logistics procedures, Air Force repair facilities will cease their reliance on mass production methods and adopt simpler, more integrated production systems that are less expensive, require less infrastructure, and can respond more quickly to changes in customer needs. (5:3) Similarly, Air Force materiel management and distribution systems will rely on commercial carriers with a hub-and-spoke distribution network to streamline the flow of materiel, reduce the need for large pools of spare parts, and reduce the need for large numbers of people to manage the spare parts. (11:1) The results are intended to produce a more responsive supply and distribution process with less management decision making that evidently slows down the current logistics system.

A RAND Corporation study team recently compared a prototype Lean Logistics system with the current Air Force logistics system using a dyna-metric computer model. The results of their study indicate that the Lean Logistics system requires one-third the amount of spare parts as the current system which translates into a substantial savings. (11:1) For example, RAND estimates that the current logistics system requires $960 million worth of inventory to support the F-16 fleet, while a lean system would require only $320 million in spare parts. (11:2) Due to the potential cost savings offered by Lean Logistics, the fact that Lean Logistics complements the two-level maintenance concept, and the fact that the need for a Lean Logistics system will be amplified with the introduction of more reliable spare parts and weapon systems in the Air Force inventory, Lean Logistics will be a force shaping all levels of Air Force logistics in the near future.

These programs have already produced more reliable aircraft and aircraft systems, less reliance on intermediate-level maintenance, the need for less support equipment, the need for fewer spare parts, and a smaller mobility footprint for deploying units. Due to the continued expectation of cost savings, the Air Force will continue to emphasize these projects. As inventories shrink, Air Force units perform less intermediate-level maintenance, and the logistics system attempts to move fewer parts faster, the Logistics Group will need to react and find a better organizational structure to deal with this dynamic environment. The next section suggests an organizational design to fit this changing circumstance.

Organizational Design

The current Logistics Group structure has been examined along with some of the forces that will drive organizational change in the Logistics Group. I will now design a new group structure. My first step in this task is to review some principles of organizational design.

Since restructuring the Logistics Group is redesigning an existing organization and not creating a new one, we can rely on years of Air Force management engineering that has honed the shape and size of many of the units in our Air Force today. After we determine a new structure for the Logistics Group, and determine what squadrons and flights will be included in that structure, the exact size of the units involved will be determined through this same management engineering process. We can therefore concentrate on just two issues of organizational design:

(1) The characteristics we want our organization to have.
(2) How we group tasks and roles of the organization into a structure.

Organizational Characteristics

As was mentioned earlier, General McPeak wanted to change the shape and style of the Air Force organization, and to do that, developed some organizational principles and themes that were used to design the objective wing. (10) We can use these same principles and themes as the characteristics we are looking for in a redesigned Logistics Group. For our purposes we can key on three characteristics:

(1) Maintain a smaller core, but keep basic capabilities, and plan for a lean but effective base force.

(2) Use simple streamlined structures with clear functional lines.

(3) Arrange for combining authority, responsibility, and capability in an organization.

The first of these characteristics reflects a realization of the political and economic pressure to downsize the Armed Forces. The Department of Defense cannot afford the force structure of the 1980s; we must get smaller and more efficient. As the Air Force operational structure shrinks, the logistics infrastructure must shrink as well. We need to determine what our core capabilities are—those tasks we will need to accomplish to support the operational force in war. We should divest ourselves of all other noncritical tasks.

The second characteristic we need to consider when redesigning the Logistics Group is that we need an organization with streamlined structures and clear functional lines. Here we are talking about getting rid of unnecessary levels of supervision as well as unnecessary redundancy. We need to get leaner with a compact mission focus. If we do not need a specific squadron or a particular level of supervision, we should delete it.

Finally, the last organizational characteristic to consider is the need to combine authority, responsibility, and capability within the organization. A squadron or flight must be given a mission and the resources required to complete that mission successfully.

Selecting a Structure

Now that we have determined the key characteristics that we want reflected in our organization, we need to concentrate on how we will group tasks and roles into an organizational structure.

There are two key factors involved in selecting an organizational structure. First, organizations divide work by creating a variety of specialized roles, functions, and units. They must then tie all these elements back together by way of vertical and horizontal integration. (2:77) Put simply, once we separate the functions by determining key tasks, we have to tie them together by line and staff relationships. Secondly, we must remember that there is no best way to organize. The right structure depends on an organization's goals, strategies, technology, and environment. (2:77)

Organizations can be structured in any number of ways. They can be structured by time such as "A" shift or "B" shift like a metropolitan police department. They can also be structured by product such as General Motors with Chevrolet, Buick, and Cadillac divisions. They can even be designed as a functional organization based on employee specialty or task. A hospital structure will often contain this type of organization with different departments such as pediatrics or surgery. Finally, an organization can be structured loosely into teams similar to many advertising or engineering firms. (2:77)

The team concept is an excellent way to structure short duration tasks. It is not, however, the ideal end state for the permanent structure of an organization with clear lines of authority and command such as the military. (6:628) We need a structure for the Logistics Group that lends itself to task-oriented work; therefore, some sort of functional design based on critical tasks would be ideal. (6:629) These critical tasks should be divided to obtain the greatest advantage from the division of labor, and whole tasks should be grouped together in a functional unit when possible. (15:43) Since the military needs the efficiency of a functional organization with a clear chain of command, and military units are performance-oriented by nature, Sloan's Federal Model of a functional organization appears ideal for a Logistics Group structure. (6:629)

Alfred D. Sloan, Jr. organized General Motors in the 1920s on the basis of a functional model. His model works well with large multidivisional companies and is characterized by centralized control with decentralized authority and execution. To this day, this structure is still the best for big, single product and single market organizations like the Logistics Group. This organizational model also tends to possess the characteristics we are looking for in an organizational structure. It is highly efficient and can be sized to meet the task at hand. It is streamlined with clear functional lines, and with it we can combine authority, responsibility, and capability into task-based units in the organizational structure.

Proposed Logistics Group Structure

To determine those core tasks that the Logistics Group must perform in the future, I circulated a questionnaire to 28 Logistics Group commanders and deputy commanders that were attending a Logistics Group Commander Professional Development Course at Maxwell AFB, Alabama, 6-17 February 1995. (14) When asked which key tasks would be required of the Logistics Group in the future, they identified four different tasks: maintenance, supply, transportation, and contracting. There was also a general recognition that the Logistics Group commander required some analysis capability for management control of the group.

This is hardly an earth shattering revelation, but if we analyze each squadron and consider the effect of downsizing and Air Force programs like Two-Level Maintenance and Lean Logistics, we may find areas where we have redundancy or non-core tasks that can be eliminated.

Maintenance Squadron

The key task of the Maintenance Squadron is intermediate-level maintenance. As newer aircraft are developed with a two-level maintenance concept, and fielded with more reliable systems, this task will undoubtedly decrease. The Accessories, Avionics, and Armament Systems flights may need to be merged in the future as the workload decreases.

In the next 15 years, however, the bulk of Air Force weapon systems are expected to be the same F-15s, F-16s, and others that we fly today. These aircraft were, for the most part, designed to be supported with a three-level maintenance

concept. Barring any massive investments in spare parts or aircraft modification programs to improve system reliability (both seemingly remote in our current fiscally constrained environment), these systems will continue with a three-level maintenance concept for the near future. This prospect of a relatively stable intermediate-level maintenance workload limits our opportunities to merge flights or restructure the Maintenance Squadron. There are, however, two flights that should be separated from the rest and looked at carefully.

The Maintenance Flight currently services transient aircraft, performs large component repair, and services wheels and tires. While large component repair and wheel and tire build-up are essential functions, servicing transient aircraft has nothing to do with intermediate-level maintenance and should be moved to another organization like Airfield Management. Large component repair and wheel and tire could then be merged with another flight.

Similarly, the Test Measurement and Diagnostics Equipment Flight performs calibration and repair of test equipment, not intermediate-level repair of aircraft systems. This service is not an absolutely critical wartime function, provided the test equipment has been recently calibrated, and the service is commercially available. This flight should be abolished and the Air Force should either award a contract to operate the laboratory or purchase this service from a commercial source.

Supply Squadron

The key task of the Supply Squadron is to provide the wing with mission essential supplies, equipment, and fuel. It is currently organized to do so with each Supply Squadron at each base computing their own stock levels and requisitioning to fill those levels. The Lean Logistics program will force the Air Force to centrally manage the smaller pool of spare parts. With improved inventory management capabilities, both at retail and wholesale level, most stock levels will be centrally computed and needed stock can be pushed to the bases. This central management could be accomplished at Air Force Materiel Command, but will probably become the responsibility of the supply staff at each major command.

In an era of downsizing, the Supply Squadron should also focus on weapon system support and not waste time stocking and handling commercially available items such as office supplies and cleaning supplies. The operation of the Base Service Store should be contracted out or, if that is impractical, the items should be purchased commercially by any organization that requires them. Those required items that are military specific such as flight clothing could be stocked and sold through a small store operated by the Materiel Storage and Distribution Flight. Finally, mobility management should be moved to the Management and Systems Flight since it is a management task that involves all flights in the squadron.

The above listed series of consolidations would allow us to abolish the Materiel Management Flight. The squadron would then be organized to concentrate on managing combat operations support, the storage and distribution of supplies, and the issuing of fuel—all wartime essential tasks.

With Lean Logistics driving the Air Force to reduce inventories, and if we are to provide the same level of support to Air Force weapon systems, we need to move these fewer parts faster. Since you can reduce spare part flow times through a given number of organizations only so far, we need to reduce the number of organizations involved in the process of spare part movements. This idea will be further developed as we examine the Transportation Squadron.

Transportation Squadron

We will begin our analysis of the Transportation Squadron by looking at the overall squadron structure. In response to my survey on key logistics tasks, various Logistics Group commanders and deputy commanders indicated that transportation was a key logistics task. There is no doubt that transportation service is essential, but it is usually part of another task and might better serve the wing if it were decentralized rather than as it is now centralized in a squadron. If we look closer at the squadron, many functions are performed that could easily be placed in another squadron or done away with to reduce overhead and streamline the Logistics Group.

The leasing of vehicles has become a common practice in industry, and the Air Force could benefit by greatly reduced overhead if it contracted the management of our vehicle fleet operations and leased the general purpose vehicle fleet. The Air Force would then only have to invest in special purpose vehicles that could not be leased such as K-loaders and fire fighting equipment. This initiative would eliminate the need for a Vehicle Operations Flight. Similarly, vehicle maintenance on general purpose vehicles should be included in the lease agreement eliminating the need for our vehicle maintenance infrastructure. The maintenance on those special purpose vehicles that the Air Force would own could be done by the Aerospace Ground Equipment Flight in the Maintenance Squadron. This move would allow us to abolish the Vehicle Maintenance Flight.

The responsibilities of the Combat Readiness and Resources Flight, which is basically mobility planning, could be incorporated into the Logistics Plans function, deleting the requirement for yet another flight.

The Traffic Management Flight performs a variety of freight and passenger movement activity that could be more efficiently accomplished by integrating this function with other organizations. The household goods shipment process and passenger movement process should be located within the personnel function which also provides the orders authorizing these movements. Similarly, the remaining freight functions, including Packing and Crating, should be located in the Supply Squadron as a Transportation Flight. It can be argued that the supply function involves not only providing supplies, but providing them where they are needed. By placing freight functions in supply, the squadron commander assumes complete control over this process.

These structural changes not only combine authority, responsibility, and capability, but also streamline passenger, household goods, and freight movement. They also allow us to totally abolish the Transportation Squadron, significantly streamlining the Logistics Group.

Logistics Support Squadron

The Logistics Support Squadron is in a similar situation as the Transportation Squadron. It is an accumulation of

responsibilities that should become parts of other squadrons or staff functions. The Maintenance Operations Flight currently tracks engine status. This function could be performed more efficiently in the Propulsion Flight of the Maintenance Squadron where the technicians actually work on the engines. The rest of the functions in this flight, such as maintenance analysis, financial, personnel, and facility management, belong in a staff organization working for the Logistics Group commander since their duties involve working with all the squadrons in the group.

Maintenance training is a responsibility of both the Operations Group and the Logistics Group. There are several other forms of task training required by various other units on a base as well. This situation lends itself to the establishment of a wing training organization manned by training specialists and functional experts. This is generally a better way to provide consistent superior training for all wing agencies and usually deletes the need for the Maintenance Training Flight.

I earlier recommended that the Transportation Squadron's Combat Readiness and Resources Flight be combined with the Logistics Plans Flight. Not only would these two flights work well together, but we should also capitalize on the synergistic effect of combining these two organizations by further combining them with Operations Plans to form a wing plans function. This would provide a comprehensive planning function for the wing and allow us to abolish the Logistics Support Squadron.

Contracting Squadron

If any squadron within the Logistics Group is facing a period of growth, it is the Contracting Squadron. The combination of factors such as the application of commercial business practices in Lean Logistics and pressure to contract for commercially available services will all cause the contracting workload to increase. Goods and services previously managed or provided by military personnel or units will be contracted to eliminate unnecessary military overhead and cultivate efficiency and cost savings. I have already mentioned several areas of potential contracting activity such as leasing our general purpose vehicle fleet or purchasing office and cleaning supplies commercially.

The Contracting Squadron is currently organized into flights based on the type of contracting service performed (construction, commodities, or services). This appears to be a suitable organization to meet the needs of the future.

The New Organization

After eliminating noncritical tasks, grouping key tasks into functional units, as well as streamlining and downsizing to eliminate expensive overhead, we are left with a much leaner Logistics Group. The group will have 40% less management overhead when compared to the previous organizational structure, will be functionally organized into squadrons based on key tasks, and will be structured to manage only critical wartime logistics functions. The group will be comprised of three squadrons (Figure 7): Maintenance Squadron, Supply Squadron, and Contracting Squadron. The Logistics Group commander will also have a small management support staff to provide the capability to do much of the analysis new Air Force programs have demanded.

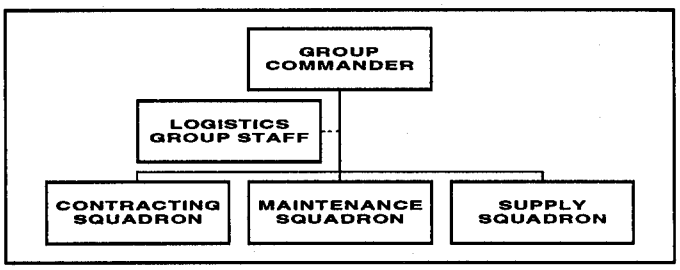

Figure 7. New Logistics Group Structure

The Maintenance Squadron will be comprised of seven flights whose sole function will be the intermediate-level maintenance of aircraft systems (Figure 8). These will be: Fabrication Flight, Accessories Flight, Aerospace Ground Equipment Flight, Munitions Flight, Propulsion Flight, Avionics Flight, and Armament Flight.

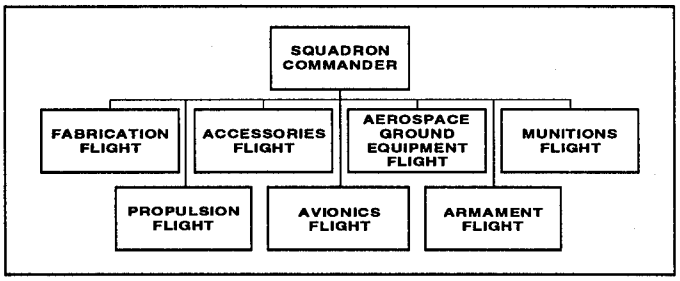

Figure 8. New Maintenance Squadron Structure

The new Supply Squadron will concentrate on mission essential supply services—direct weapon system support, fuels support, the physical handling and storage of property, and the overall management of these services. With the addition of a Transportation Flight, the Supply Squadron will be responsible for property handling from the time an item arrives on a base until it departs. I believe this is a more logical grouping of tasks and responsibilities than currently provided by a separate Transportation Squadron and Supply Squadron. The new Supply Squadron will have five flights (Figure 9): Management and Systems Flight, Combat Operations Support Flight, Materiel Storage and Distribution Flight, Transportation Flight, and Fuels Management Flight.

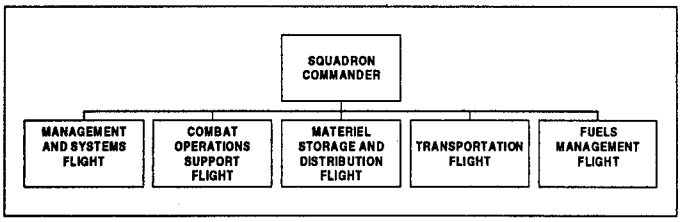

Figure 9. New Supply Squadron Structure

Finally, the Contracting Squadron will maintain its current organizational structure, but it is likely to face an increase in workload as more services are contracted and as the need to eliminate military infrastructure grows.

This new Logistics Group structure acknowledges the forces that are reshaping Air Force logistics and postures the wing's logistics structure to meet tomorrow's challenges.

Conclusion

Faced with falling defense budgets and a changing world situation, General McPeak led an effort to restructure the US Air Force. Rather than simply reduce manpower and force structure across the board, General McPeak wanted to reorganize to develop a smaller but more capable Air Force with less management overhead.

To carry out the guidance from Air Force headquarters, the Air Force Major Commands were reorganized in keeping with the "Global Reach and Global Power" theme. The Numbered Air Forces were reduced in size and refocused on war fighting tasks. Finally, the Air Divisions were eliminated as an organizational level to further streamline the Air Force structure.

At base level, the "objective wing" was developed which divided base functions into groups. Some organizational changes were made within the Operations Group that brought flight line maintenance into the operations squadrons. The Logistics Group, however, was formed simply by adding the intermediate-level maintenance function to the squadrons that made up the former Deputy Commander for Resources function.

There are forces and programs in being today, in addition to reduced budgets and political pressure to downsize, that will change Air Force logistics and drive the need to restructure the Logistics Group. Reliability and Maintainability 2000 is driving a significant increase in weapon system reliability leading to less reliance on intermediate-level maintenance and the need for fewer spare parts. The Air Force's Two-Level Maintenance program will combine with improving weapon system reliability to greatly reduce the Air Force's need for intermediate-level maintenance. Finally, Lean Logistics seeks to incorporate successful commercial business practices into Air Force logistics, greatly reducing our requirement for large inventories of spare parts.

When designing a new Logistics Group we need to incorporate three key characteristics:

(1) We want the group to get smaller, but keep our core capabilities.

(2) We want a streamlined structure with clear functional lines.

(3) We want to combine authority, responsibility, and capability within an organization.

Sloan's Federal Model of a functional organization is an ideal structure for the Logistics Group since it works well with performance-oriented organizations, it has a clear chain of command, and it derives a great advantage from division of labor. Using this model, we can determine key tasks in the Logistics Group and use them as the basis for forming squadrons. Then, to streamline and reduce overhead, we can combine complimentary tasks within squadrons and divest ourselves of noncritical or commercially available services and tasks.

The key tasks within the Logistics Group are intermediate-level maintenance, supply, transportation, and contracting. Before grouping these tasks into squadrons there are several consolidations and deletions that need to be made:

- Within the Maintenance Squadron, the Maintenance Flight should be eliminated with transient maintenance being moved to another agency and the other functions in the flight being incorporated into the other flights. Similarly, the Test Measurement Diagnostics Equipment Flight should be abolished since this service is commercially available.
- The Supply Squadron must concentrate on direct weapon system support. To this end, the Materiel Management Flight will be abolished with inventory management tasks centrally managed and the Base Service Store closed. A residual freight function from the Transportation Squadron will form a Transportation Flight within the Supply Squadron.
- The Transportation Squadron will be abolished, and the responsibility of contacting commercial carriers to move household goods and passengers redirected to the Base Personnel Flight. Management of our general purpose vehicle fleet should be contracted out. These vehicles should be leased with required maintenance. Those special purpose vehicles that the Air Force must buy could be managed by the using organization with the Aerospace Ground Equipment Flight in the Maintenance Squadron providing the maintenance. The mobility planning functions of the Combat Readiness and Resources Flight should be merged with other planning functions in a wing planning organization. Finally, as mentioned above, the residual freight functions would move to the Supply Squadron.
- The Logistics Support Squadron should be abolished. The engine management tasks of the Maintenance Operations Flight could be better performed in the Propulsion Flight of the Maintenance Squadron. The other tasks of financial, personnel, and facility management should move to the Logistics Group commander's staff. The Maintenance Training Flight should be combined with all task training in a wing training organization. Similarly, the Logistics Plans Flight should move to a wing planning organization.
- The Contracting Squadron will remain essentially as currently organized, but a significant workload increase can be expected as we contract out many services that were previously provided by military personnel.

The resulting Logistics Group will be comprised of three squadrons: the Contracting Squadron, the Maintenance Squadron, and the Supply Squadron. A staff organization will also be added to assist in the management of various programs and to provide an organic analysis capability.

The results of this Logistics Group restructuring will be a greatly streamlined and efficient organization with 40% less management overhead. The group will be centered around key wartime logistics tasks and will posture the group to deal with future changes in Air Force logistics.

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(Continued from page 23)

inadequate for the task. If something such as this were to occur, the entire system would be under great pressure to find a quick fix—a fix that probably could have been discovered much earlier and incorporated into the system or process submitted to the CINC.

With respect to planning, the system works the same. If the CINCs are going to be the war fighters, then they will—they must—eventually be involved in the planning. By involving them in the planning from the beginning and incorporating their ideas as budgets and force structure are developed (to name only two examples), the total planning time involved is reduced. It makes no sense at all for everyone *but* the CINCs to be involved from the very beginning. If this were to be done, there is the risk that once the CINCs are involved (as they must be), their inputs might torpedo the entire planning process, forcing the whole process back to the drawing board.

Conclusion

The Definition process currently in place is very good. It is an integrated approach that ensures all of the agencies in the Department of Defense are moving toward the same goal and that their tacks are complementary to one another in an effort to attainthat goal. It involves all the players from the very beginning, thus ensuring that issues are addressed early in their life, and that the best possible solution within the existing fiscal constraints is found. Because of the fiscal restraints of the process, in no way will everyone get what he or she desires, however, one will hopefully get a result he or she can live with. The nature of the system ensures this outcome.

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Most Significant Article Award

The Editorial Advisory Board has selected "The De-Evolution of Space: A Vision for Combat Capable Space Systems" by Major Jeffrey L. Caton, USAF, as the most significant article in the Winter 1995 issue of the *Air Force Journal of Logistics.*

USAFE's New Regional Support Groups: Theater Oversight and Planning

Captain James M. Stewart, USAF

Introduction

As with other major commands, United States Air Forces in Europe (USAFE) is downsizing and streamlining to meet congressionally mandated reductions resulting from communism's fall. But while USAFE's mission changes to meet the challenges of the "new world order," many of its pre-Cold War mission requirements, namely regional exercise/ contingency force reception planning and the oversight of Geographically Separated Units (GSUs), have not. Traditionally, USAFE oversaw its GSUs and conducted regional force reception planning through its "working arms," the numbered Air Forces (NAFs); a concept which flourished during the days of robust funding and manning of the late eighties and early nineties. But as funding and manpower were reduced, USAFE and NAF staffs were having difficulty effectively performing the wartime beddown, exercise support, and war reserve materiel planning without augmentation. In addition, GSUs, which traditionally had difficulty receiving support and command attention, were facing the daunting task of competing for increasingly scarce resources and funds. USAFE's solution to these problems was a new, streamlined organization reporting directly to the NAF commander; the Regional Support Group (RSG).

The New RSG Concept

USAFE's three RSGs, the 603rd, 616th, and 617th were activated on 1 July 1994. Each RSG is designed to enhance the NAF commander's war fighting ability and provide a mechanism for non-objective wing and GSU oversight by placing them under a single commander. In addition to providing the NAF commander direct oversight, the new RSG concept relieves operational wing commanders of their traditional GSU management responsibility, enabling them to concentrate on their operational mission.

During peacetime, the RSGs are a principle subordinate unit reporting directly to the NAF commander. Figure 1 portrays both the peacetime and wartime command structure.

The three USAFE RSGs range in size from approximately 700 authorizations in 3rd and 16th Air Force to approximately 1,600 authorizations in 17th Air Force. Within these authorizations lie a wide diversity of GSUs ranging in size from one to several hundred personnel. These units, which are spread across several European and Mid-Eastern nations, fulfill a broad spectrum of operational support missions ranging from munitions support to contingency hospital oversight. Despite their diversity, a common thread runs through each RSG unit; they all lack direct access to base operational support (BOS) functions and the large staffs associated with them. As a rule,

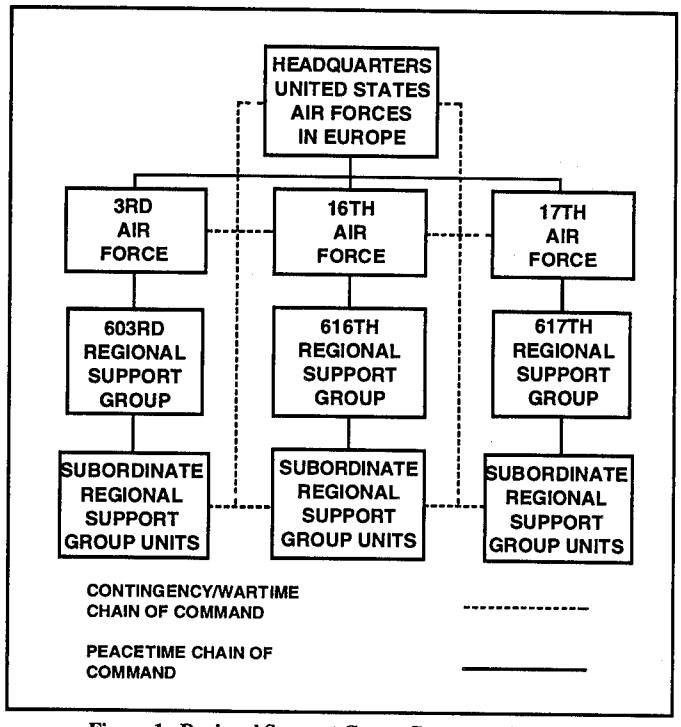

Figure 1. Regional Support Group Command Structure

all BOS support for the RSG staff and GSUs comes from designated Army, Air Force, and Navy main operating bases (MOBs) and/or host nations. Although the RSG commander lacks the depth and breadth of BOS support available to a main operating base, he retains much of the staff expertise required for non-objective wing and GSU oversight.

GSU Oversight

One of the RSG's major responsibilities is theater oversight of GSUs and units located on the MOB which have regional responsibilities but are not contributing directly to the operational mission of the wing (non-objective wing units). The RSG commander accomplishes this oversight through a streamlined staff of functional experts.

Each RSG is comprised of a group staff to provide typical administrative capabilities and personnel specialists for matters such as assignments, promotion recommendation forms, management level evaluation boards, and performance evaluations. The group staff also consists of a judge advocate (military justice, host nation laws, environmental law, and treaty compliance matters), a budget officer (GSU financial oversight and organizational and maintenance funds management), a logistics plans officer (oversight of memorandums of understanding and support agreements with main operating

bases, host nations, and other DOD agencies), and a civil engineer (planning, programming, design, and construction management). Each member of the 12-person staff is responsible for directly supporting, or indirectly ensuring the MOB supports, each GSU and non-objective wing unit under the RSG's umbrella. In addition to theater GSU oversight responsibilities, the RSG also directly enhances the NAF's war fighting capability by providing consolidated force beddown planning capability and management of War Reserve Materiel (WRM).

War Fighting Enhancement

Two RSG units, the Regional Planning Flight (RPF) and the Materiel Maintenance Squadron (MMS), directly enhance the capability of the war fighting NAF to beddown forces and support theater contingency operations.

Regional Planning Flight

The RPF is a tailored organization with the organic expertise required to plan for, receive, and beddown US forces at host nation bases. The RPF consists of functional experts in aircraft maintenance, civil engineering, communications, fuels, medical plans, services, transportation, and logistics plans. Deploying as a team, the RPF develops all required joint support or exercise beddown plans, coordinates host nation requirements, determines and coordinates medical support, finalizes contracting actions (billeting, rental cars, etc.), and arranges for War Reserve Materiel (WRM) support. These actions usually take place during a pre-deployment site survey. The final step in the beddown process is completed when the deploying unit arrives at the exercise/ contingency location; the RPF is there to role out the red carpet and provide a seamless handoff for all logistical support. All RPF planning and beddown activities are effectively performed by consolidated planning cells requiring half the manning necessary prior to the RSG implementation. Sustaining BOS for deploying forces will come from the closest MOB, while the RPF performs a liaison function. After each deployment, the work load of the RPF continues with after action/lessons learned reports and follow-up corrective action. Complementing the RPF is the MMS, with the capability to provide logistical support equipment and materiel necessary to sustain operations at remote locations.

Materiel Maintenance Squadron

Contingency and exercise forces may have the luxury of deploying to a fully equipped MOB or they may be required to beddown at bases with little more than a runway, also known as bare bases. The RSG's MMS has the capability to provide equipment and materiel support for either extreme. The mission of the MMS is to receive, store, maintain, and distribute WRM equipment and supplies. Driven by the capabilities of the deploying unit and the infrastructure of the beddown base, the MMS custom tailors its support packages. For units deploying into a bare base, the MMS can deploy up to four 1,100-person Harvest Eagle Kits (616 MMS only). Each Harvest Eagle Kit comes with all logistical support materiel to include furniture, kitchen sets, generators, air conditioners, etc. In addition to the Harvest Eagle Kits, the MMS will commonly distribute a broad range of support vehicles to include pickup trucks, tractor-trailers, and forklifts. For supporting airlift and fighter operations, the MMS also stocks required tanks, racks, adapters, and pylons (TRAP); aircraft generation equipment (AGE); gun barrels; mobile aircraft arresting systems (MAAS); and other maintenance support equipment. For example, if an 18-primary authorized aircraft (PAA) unit of F-16s were to deploy to a remote site in Africa, the 616 MMS would equip the unit with a pre-assembled standard package designed to support 18 F-16s. These standard packages, containing all equipment required to support specific fighter types and numbers, are called Standard Packages of WRM Support (STOWS). Most MMS support equipment is maintained in "ready to ship" condition and can be deployed on very short notice. Depending upon the type of equipment being requested, Headquarters USAFE or Headquarters USAF are the final approval authorities for the distribution of WRM.

Summary

The new RSG concept is continuing to evolve and is proving itself each day by providing clear mechanisms for focused non-objective wing and geographically separated unit oversight and NAF war fighting enhancement. For the first time, GSU commanders have an advocate, the RSG staff, who's goal is ensuring their units receive timely and quality support from MOBs. Unlike MOB support staffs, the RSG staffs' functional experts are able to focus on the unique problems of units removed from their sources of support; pressing issues requiring headquarters action can be quickly elevated through the RSG to the NAF commander for resolution. In "the new world order," military forces are increasingly tailoring their operations planning to contingencies, limited in both scope and duration. The RSG directly enhances NAF commanders' capability to support these operations by providing a streamlined organization with the capability to plan, beddown, and equip a variety of ground and air forces.

The new Regional Support Groups are a concept who's time has come. By fulfilling their charter, the RSGs enhance the quality of life and mission accomplishment of their subordinate units, the war fighting capability of the NAFs, and enable objective wing commanders to concentrate on their operational missions.

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Forging Pacific Coalitions Through Logistics

Headquarters Pacific Air Forces (PACAF) conducted the first international logistics symposium at Andersen Air Force Base, Guam, from 28 August through 11 September 1995. The symposium, dubbed "Logistics '95," was designed to establish contact and to exchange information among logistics officers from major PACAF units and allied air forces in the PACAF theater. Countries represented were Mongolia, Thailand, Tonga, Fiji, Indonesia, Malaysia, New Zealand, Bangladesh, Sri Lanka, Cambodia, Singapore, Brunei, and Papa New Guinea. The representatives, some from countries who do not share the same political views, took vast amounts of notes as both they and PACAF personnel provided a variety of presentations. Topics included logistics organizational structure and management procedures of the United States Air Force and those of our allies. While some of the procedures briefed have been in practice for an extended period and are well-developed, our guests nevertheless demonstrated great interest in the way we do "business." This was true for representatives from those countries with large, sophisticated air forces as well as from those without. The primary objective of information exchange was therefore a success.

A second, unstated objective was also accomplished—that of coalition building. Although the exchange of information was important, so was the further development of these coalitions. In the age of dwindling budgets and continuous political constraints, coalition building for PACAF continues to be of prime importance when addressing better ways to meet Asian contingencies. Never has our relationship with our allies been more crucial than now, as the effects of years of drawdown continue to be felt. In PACAF, and particularly 13th Air Force, this is especially true when considering the number of countries located in our area of responsibility.

PACAF is committed to meeting the needs of our partners quickly. To do this we are striving to first know who our partners are in order to understand just exactly what those needs are. Given the proper climate for ad hoc coalitions, we recognize too that our partners could come from nontraditional countries. We have found the best way to gain understanding remains through face-to-face contact. The symposium was a great way to obtain this much needed contact with many of our Pacific partners.

As we observed these traditional and nontraditional allies discussing logistics concepts, it became apparent all were seeking ways to apply and/or merge new concepts into their own. This is particularly interesting when you consider the wide variety of weapon systems these air forces employ as well as the degree of sophistication found in their support systems.

The logistics symposium proved to be a great way to extend the network of alliances and mutual interests we share in the Pacific region. We hope these lessons can be shared with logisticians worldwide to increase the mutual respect with nations in other regions as well. There is no community better suited to build these coalitions than logistics.

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